DEPT

JANUARY 1954

FOUNDRY

...WHEREVER METALS ARE CAST

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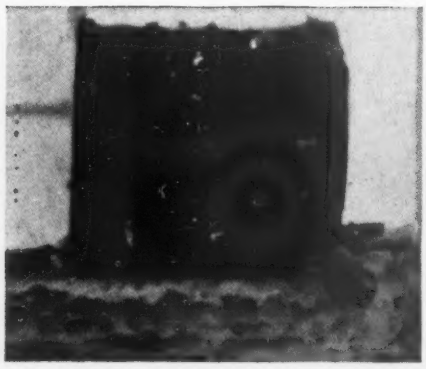
OUTSTANDING CUPOLA CAST IRON DEOXIDIZER!

This FERROCARBO patented Briquette disperses completely in 57.5 seconds



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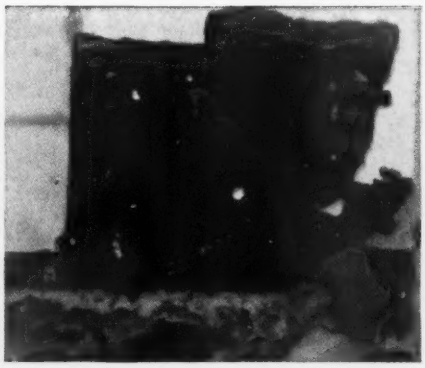

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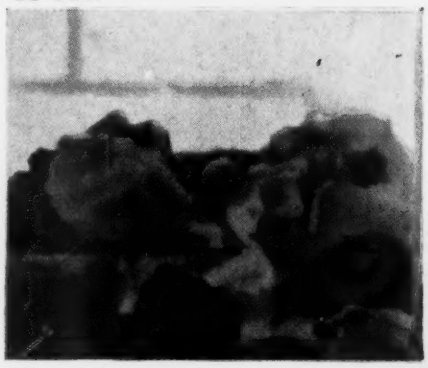

57.5 SEC.

Here's dramatic proof, in actual film sequences, that FERROCARBO Briquettes are truly *effective* in deoxidizing cupola iron. Rapid, controlled disintegration of FERROCARBO Briquettes is *complete* in the melting zone. 100% dispersion of the briquette throughout the metal means a thorough reaction in the cupola. You can't match FERROCARBO Briquettes for uniform cupola operation . . . for castings that are cleaner, more uniform, easier to machine. No wonder nearly 600 leading foundries are deoxidizing their cast and malleable iron with FERROCARBO Briquettes!

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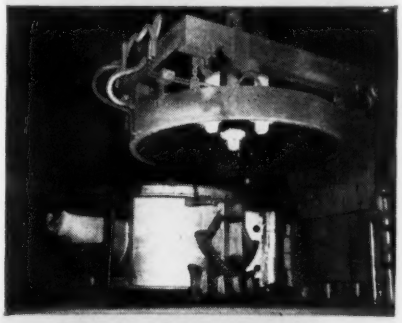
Writ

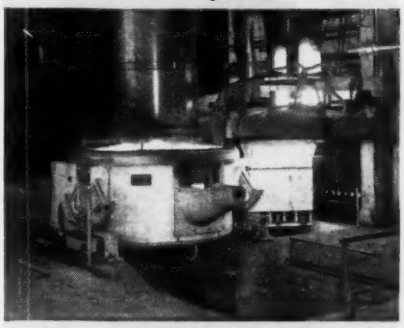
WHITING

Hydro-Arc

ELECTRIC FURNACES



Hydro-Arc furnace with roof lifted and swung aside.



An "orange-peel" drop bottom bucket fills furnace with one drop.

"Business End" of HYDRO-ARC Furnace. Servo Units used to raise or lower electrode arm.

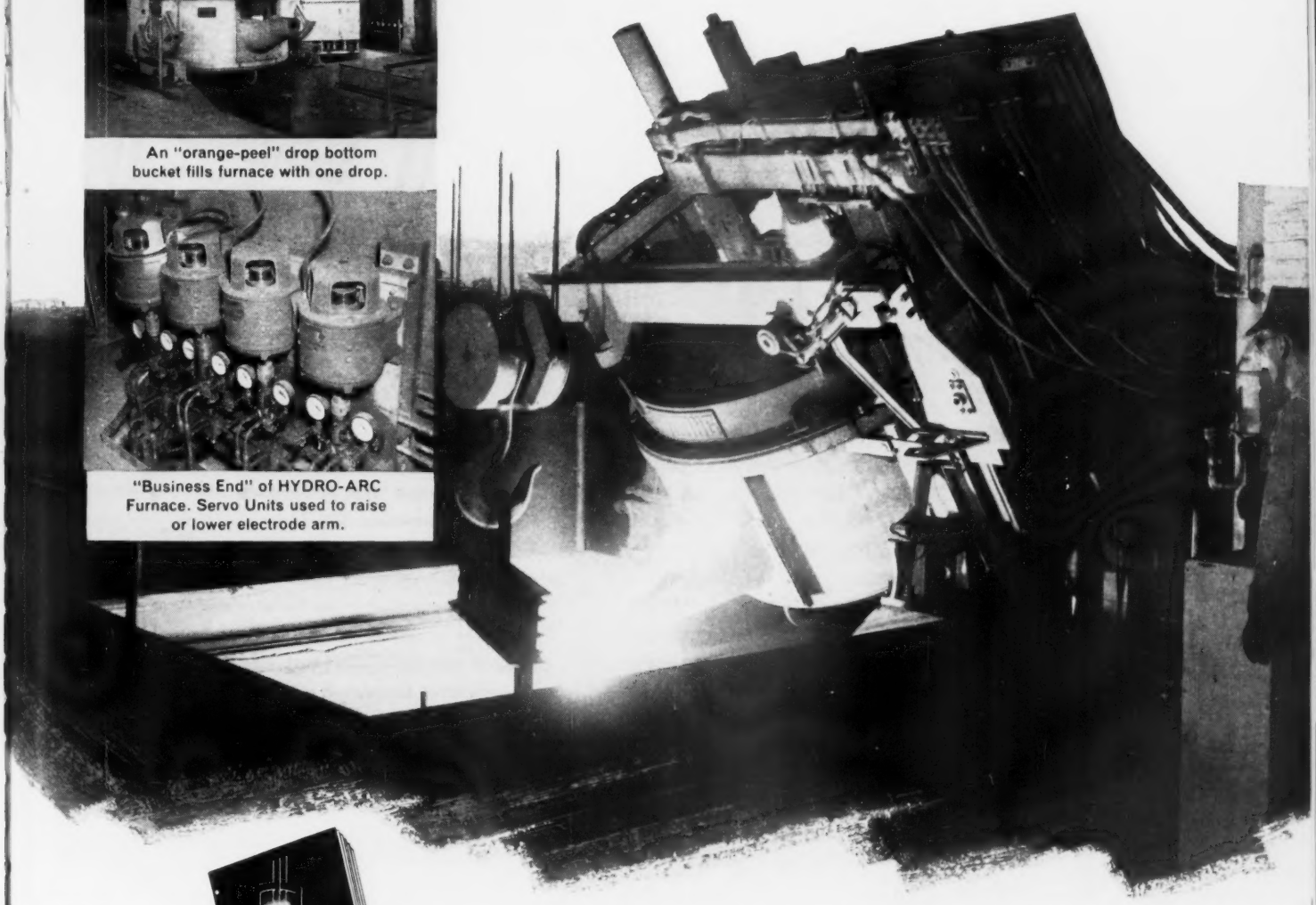
HERE'S THE "Pace-Setter" IN ELECTRIC MELTING!

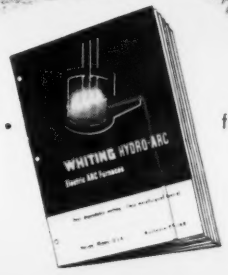
You ask, "What electric furnace offers the most advantages?" The answer is WHITING HYDRO-ARC because of its important, advanced engineering principles! To name a few:

1 **The Hydro-Arc Automatic Electric Clamp,** pioneered by Whiting, saves up to 90% of furnace down-time for slipping electrodes. It also means an 8% increase in operating time and production . . . and in addition, the elimination of the hazardous electrode slipping operation.

2 **The Unique Hydro-Arc Top Charge,** a load factor improvement, reduces furnace down-time for recharging to only a few minutes. Because of its sound, basic simplicity, limit switches are eliminated and maintenance is held to a minimum.

3 **The Hydro-Arc Air-Counterbalanced Hydraulic Electrode Positioning Equipment** assures less electrical energy and electrode consumption as well as improved metallurgical control and longer refractory life.





Write today . . . for 40 page bulletin FY-168. It completely describes Whiting Hydro-Arc Electric Arc Furnaces!

WHITING CORPORATION
15607 Lathrop Avenue, Harvey, Illinois

HERE'S ALL YOU NEED

These three additives will provide the precise sand characteristics needed for your work. FEDERAL GREEN BOND for desired sand strength. CROWN HILL SEACOAL for carbon content. FEDERAL SAND STABILIZER for flowability. And of the three, FEDERAL STABILIZER can be the one factor to really "balance out" your sand for better results. FEDERAL STABILIZER definitely provides better flowability so green strength can be run higher—makes for easier, more uniform ramming—allows a wider range of safe moisture content—minimizes lumpy shakeout to permit maximum sand reclamation.

HERE'S GOOD NEWS! You now have a choice of "DUSTLESS" or "regular" CROWN HILL SEACOAL and FEDERAL PITCH BINDERS. The new "dustless" type is chemically treated to minimize dustiness in handling. This treatment in no way affects the performance of any sand additives. The difference is in handling—working conditions are greatly improved through the reduction of skin irritation and dust inhalation. The slight additional cost is more than offset by more healthful working conditions, better "housekeeping" and the elimination of losses in air-swept mixing and handling equipment. Ask your FEDERAL representative to show you the convincing demonstration of "dustless" additives.

Make your foundry a better place in which to work!

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FOUNDRY

Volume 82—Number 1

JANUARY
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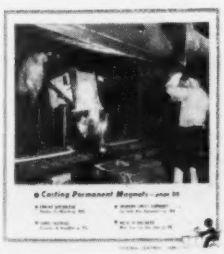

THE COVER: Pouring a stack mold assembly at the new General Electric Co., Carboloy Department, permanent magnet foundry in Edmore, Mich. See complete story on p. 86

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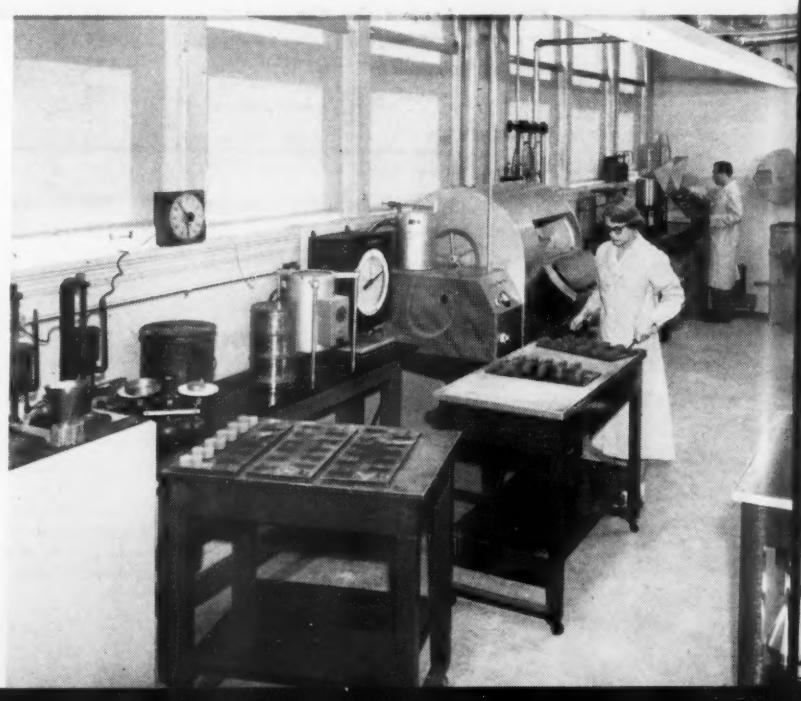
the fastest-moving line in the Foundry Field... on its way to you . .

Archer **LIN•O•CEL** is the most effective sand stabilizer available. It improves flowability, which in turn, produces better tolerance and definition. Because LIN-O-CEL compensates for sand expansion, it stops rat-tails, buckles, and scabs which normally might occur due to denser rams made possible by improved flowability.

LINOIL, the most-used core oil in America, produces stronger cores at less cost. You can find among the seven grades of "700 LINOILS", for instance, an oil practically tailor-made to your core requirements. Whatever the grade selected, you can depend upon uniformity from shipment to shipment.

STOP!

Whether or not you are using ADM foundry products, it pays periodically to check your core mixture. Proper use of any material will save you production dollars. Your LINOIL man can assist you in analyzing your specific core problems. He is backed by fully-equipped laboratories, experienced ADM chemists, and foundry technicians who will analyze your problems upon request.



Impoved foundry methods demand a constant flow of modified oils and binders, as well as entirely new products for core making and molding. The need today is for greater efficiency at lower cost.

ADM keeps pace with the foundry industry by anticipating its needs through never-ending research. Proof lies in the fact that more than half the core binders consumed in American foundries are made by ADM. Furthermore, foundrymen know they can rely on ADM for absolute uniformity . . . and service second to none.

. . from ONE SOURCE!

INDUCTOL, the new pre-baked core oil, bakes in half the time required for conventional oils. It bakes over a wide temperature range and resists over-baking so that large and small cores can be successfully baked at the same time. INDUCTOL produces considerably less gas than most core oils.

FREFLO is used two ways: (1) As a core sand conditioning agent to reduce stickiness and improve workability. (¼ of 1% by weight should be added during the final 30 seconds of mixing.) (2) As a parting compound for metal molding patterns. FREFLO is a great aid in modern, high-speed equipment.

The most recent addition to the ADM line is **ADMIREZ** resin binders. Available in urea and phenol formaldehyde types in both liquid and powdered forms for cores. Phenol type also available in powdered form for "C" (or shell molding) process.

EREVER YOUR FOUNDRY IS LOCATED, there is an
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MICHIGAN
Detroit 35,
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MINNESOTA
Minneapolis 2,
600 Roanoke Building

MISSOURI
St. Louis 19,
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NEW YORK
Buffalo 3,
1142 Marine Trust Bldg.
New York 7,
9th Floor, Woolworth Bldg.

OHIO
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1935 LeVeque Lincoln Tower
Toledo 5,
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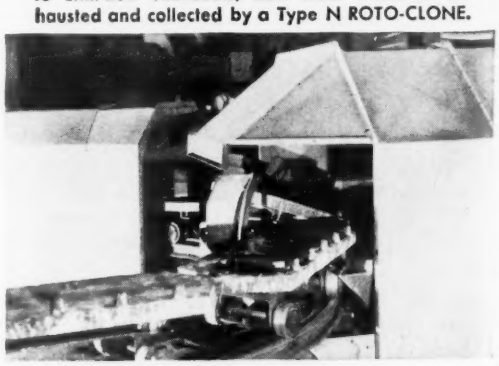
West Coast Foundry OUTLAWS DUST!

MODERN SAND HANDLING AND SHAKEOUT OPERATIONS FEATURE

ROTO-CLONE DUST CONTROL

Type N ROTO-CLONE (center) exhausts dust from Link-Belt sand preparation unit. Type N, at left, exhausts all shakeout operations.

Two views show molds being dumped automatically to Link-Belt shakeouts, dust from which is exhausted and collected by a Type N ROTO-CLONE.



Forty tons per hour of molding sand are reconditioned and handled in this Los Angeles County malleable iron foundry! Dust problems? None—inside or out—because sand preparation equipment and shakeouts are exhausted by two Type N ROTO-CLONES.

Why the Type N? Because its method of wet collection makes for highest cleaning efficiency—permits removal of collected material as sludge or slurry, eliminating a secondary dust problem. Simplicity of design eliminates possibility of plugging, in spite of fine clay particles and moisture-laden air.

If dust is causing an air pollution problem inside or out your foundry, there's a "sure cure" to be found in AAF's complete ROTO-CLONE line. For information, call your local AAF representative or write for Bulletin 270.

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Move More with a **MICHIGAN**

Handling scrap metal and waste sand every day at AUTO SPECIALTIES FOUNDRY

JOB FACTS

Job: Unloading and piling scrap, loading trucks for delivery to furnaces; handling waste sand; steel setting and erection, plant maintenance work

Machine: MICHIGAN T6K crane, with 25′ boom—29″ magnet or ⅜ yard clamshell

Owner: Riverside Foundry Division of Auto Specialties Mfg. Co., St. Joseph, Michigan

Performance: Versatile and completely satisfactory for many jobs. Upkeep expense considered very low.

A busy machine of many uses, at the Riverside Foundry Division of Auto Specialties Manufacturing Co., the MICHIGAN T6K was steadily on the job for five solid years, working every day, before its first overhaul.

Equipped with magnet or clamshell, the husky air-controlled MICHIGAN does all handling of scrap: unloads it from cars, piles it, loads it into trucks for delivery to furnaces. With a clamshell it handles waste sand to be dumped, then follows to spread the waste. In addition it excavates and loads new sand; and handles steel erection and plant maintenance jobs. A versatile and necessary tool that performs with great satisfaction and little upkeep, plant officials report.

Have you looked into how this up-to-date handling method can save time and money for you? It's worth investigation—which costs nothing, may lead to substantial cuts in costs. Talk to your MICHIGAN dealer—and send for interesting air control booklet, "More Yardage Through Air Power." Use the coupon.

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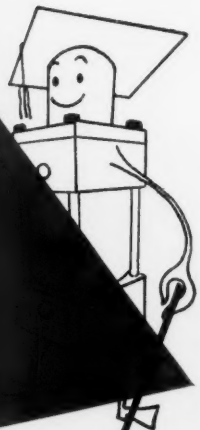
Miller Standard Air Cylinders are so soundly designed and sturdily constructed that, even under the severe abrasive conditions of foundry service, they provide extremely long life without requiring packing replacement or other maintenance.

They are offered in a complete line of "custom-built" units available on normal scheduled delivery in *thousands* of combinations of bore, stroke and mounting to meet every foundry need.

They feature the SPACE-SAVING SQUARE DESIGN originated by Miller in 1945 and fully met the J. I. C. Pneumatic Standards years before their adoption in 1950.



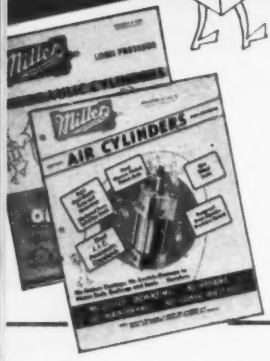
"Stock" Cylinders

In addition to its "custom-built" line, Miller offers identical quality air cylinders "stocked" for *immediate delivery* in 200 popular combinations of bore, stroke and mounting as follows:

NON-CUSHIONED: 2", 2½", 4" and 6" bore sizes each available in 2", 4", 6", 8" and 11" stroke lengths.

CUSHIONED BOTH ENDS: 2", 3¼", 5", and 8" bore sizes each available in 3", 5", 7", 9", and 13" stroke lengths.

Cylinders are base Model A53 with foot, flange, and pivot mounting attachments available as desired.



WRITE FOR CYLINDER BULLETINS A-105 and H-104

Complete Miller cylinder line includes: air cylinders, 1½" to 20" bores, 200 PSI operation; low pressure hydraulic cylinders, 1½" to 6" bores for 500 PSI operation, 8" to 14" bores for 250 PSI; high pressure hydraulic cylinders, 1½" to 12" bores, 2000-3000 PSI operation. All mounting styles available.

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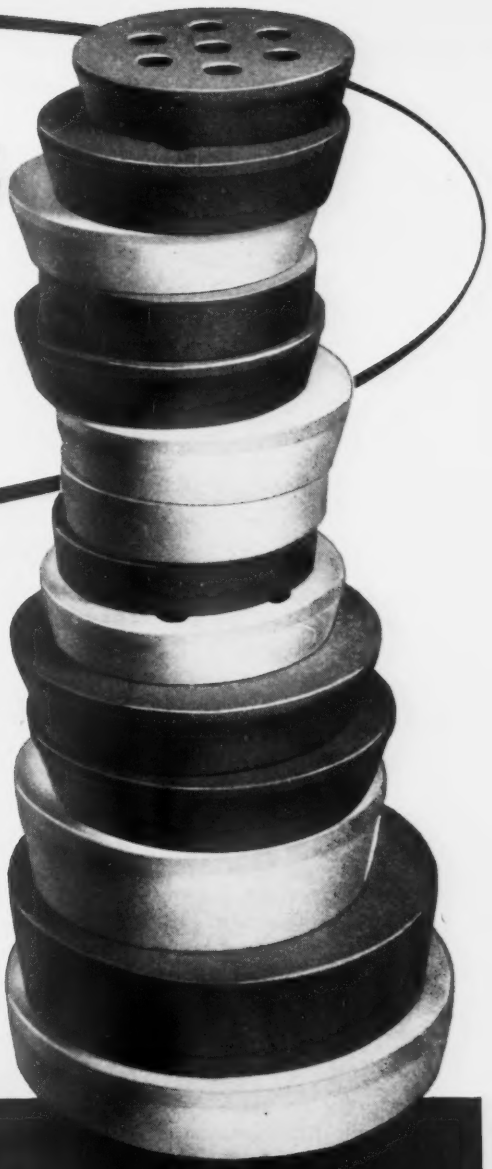

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Economical, withstands pouring temperatures of iron, aluminum, bronze, brass, and similar metals.

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Special heat shock resistance. Excellent for all metals with exceptionally high pouring temperatures.

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for details on AlSiMag Strainer Cores—standard sizes and custom designs—and AlSiMag Cut-off Cores, Troughs, and Gate Tubes.

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Samples of standard sizes free on request. Samples made to your own specifications at reasonable cost.

MORE ECONOMICAL THAN SHOP-MADE SAND CORES

- Resistant to heat shock
- No erosion at any normal pouring temperature
- Non-spalling
- Completely free of gas
- Not affected by moisture
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- Do not contaminate scrap
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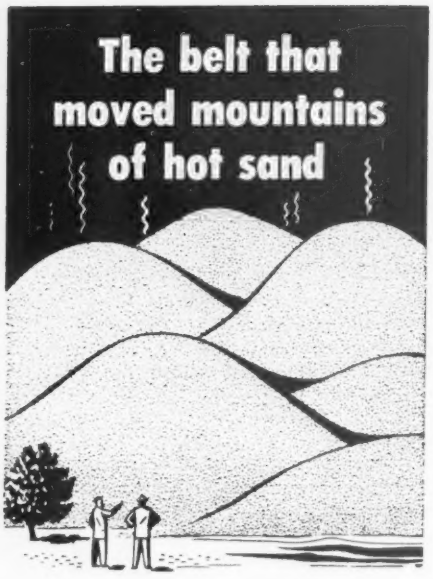

Imperial Sahara Belt ran 9000 hours at Westinghouse Air Brake

The sand moved by an Imperial Insulated Sahara Belt in the Air Brake Division brass foundry at Westinghouse Air Brake Co. is measured in mountainous proportions. Working 16 hours a day for 2 years, 5 months and 14 days, this durable belt (18 in. x 5 ply, 150 ft. long) transported 26,820,000 pounds of sand at temperatures up to 400° F. . . . an amazing service record.

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Such durability in handling hot materials is built into Imperial Sahara Belting. Constructed of heavy-duty, tightly-woven hard silver duck, it is double-stitched for positive prevention of ply separation. Special impregnation and insulation give high heat and wear resistance.

Best because it's job-designed

Imperial Belts for all purposes are *job-designed* for your specific operating conditions. Imperial Belts can reduce your mountain-size materials conveying and elevating problems to money-saving molehills. Write for catalog and prices today.

FIRST in stitched canvas belting for over 40 years.

Imperial BELTING CO.

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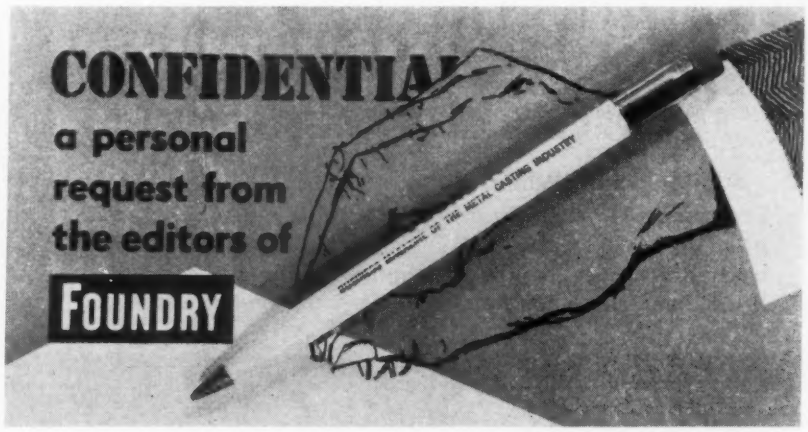
Engineered Belting—
The Right Belt For Each Job

With the Editors

WE Need Your Help: Every now and then it is good for an industry to take stock of itself to determine if its plant and equipment is sufficiently modern to meet growing competition. Such a study, termed an inventory of foundry equipment, was completed by FOUNDRY in 1947, and a special 24-page insert presenting the results of the study in considerable detail was included in the March, 1947 issue. The survey proved of considerable interest to the foundry and allied industries.

With the postwar boom of accumulated demand showing signs of tapering off, and with business apparently seeking a normal level of operation which brings a highly competitive situation, the need for a detailed study of the facilities of the foundry industry seems apparent. Regardless of the fact that the greatest period in mechanization and modernization has been under way for over ten years, it is well to know if the industry has the plant and equipment to produce quality castings at the lowest possible price.



To develop this study, the editors of FOUNDRY are in the midst of an important confidential study. An attractive questionnaire, shown above, which asks a number of questions regarding equipment in use and the age of such equipment, has been mailed to a large segment of the foundry industry. Many of these questionnaires, with much valuable information, already have been returned. If you have received one and as yet have not taken the time to fill it out and mail, we hope you will do so quickly. By so doing, you will be contributing to one of the important studies of the industry.

The study will be presented in detail in an early issue.

—o—

Good Gating Pays Off: Visits to foundries, especially the miscellaneous jobbing variety, continues to emphasize the importance that good gating plays in success of a business. Last November I called on a relatively small nonferrous foundry making both copper-base and aluminum castings. The shop seemed exceptionally busy, and upon inquiry I found that the company was forced to farm out some jobs because demand was greater than capacity. Naturally I wondered why the company was enjoying good business at a time when other firms were complaining about a declining demand.

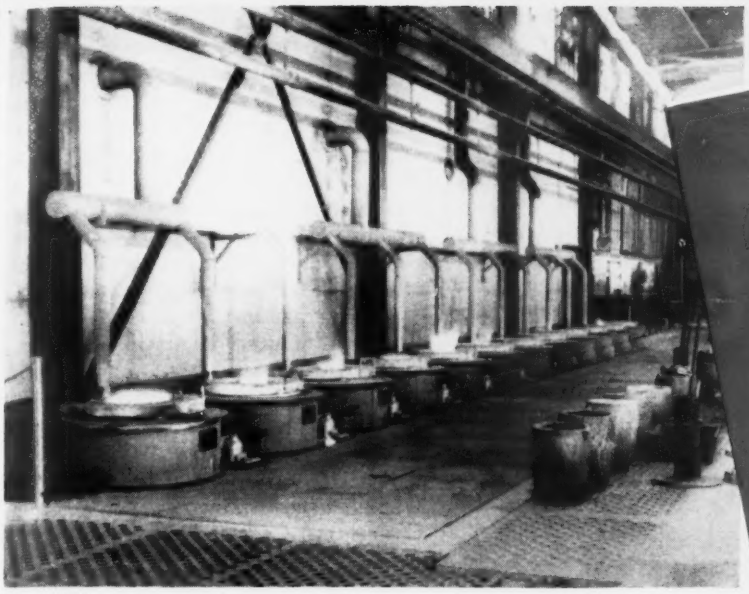
The answer became apparent in talking to the young superintendent. This company was building a reputation of producing good, sound castings when some other shops had found it difficult to make the jobs satisfactorily. Several intricate castings of the difficult-to-cast variety were shown and the superintendent explained the work that had been done to find correct methods of gating. Because the staff had a good knowledge of gating and applied this to each job that came in the shop, losses were exceedingly low.

Perhaps we need more young men who can find an exciting challenge or an interesting game in solving the gating on each new casting.

—o—

Sensation Seekers: Some business publications seem to take great delight in holding up the foundry of a

(*Concluded on page* 12)



A battery of gas fired, stationary Crucible furnaces at U. S. Naval Gun Factory, Washington, D. C. The pipes manifolded to each set of three furnaces supply air at one pound pressure. Proportional mixers assure constant gas-air ratio set for maximum fuel efficiency and proper furnace atmosphere.

Speed up melting with CRUCIBLE FURNACES

Metal Quality is best and costs are lowest when CRUCIBLE FURNACES are operated at maximum efficiency

THESE FIRMS CAN TAKE CARE OF ALL YOUR REQUIREMENTS FOR

CRUCIBLE MELTING

Lava Crucible-Refractories Co.
American Refractories & Crucible Corp.
Electro Refractories & Abrasives Corp.
Ross-Tacony Crucible Co.
Vesuvius Crucible Co.
Joseph Dixon Crucible Co.

BEST OPERATING CONDITIONS DEPEND ESSENTIALLY ON—

- ✔ 1. adequate fuel and air supply
- ✔ 2. proper fuel air ratio
- ✔ 3. furnace lining and covers in good condition

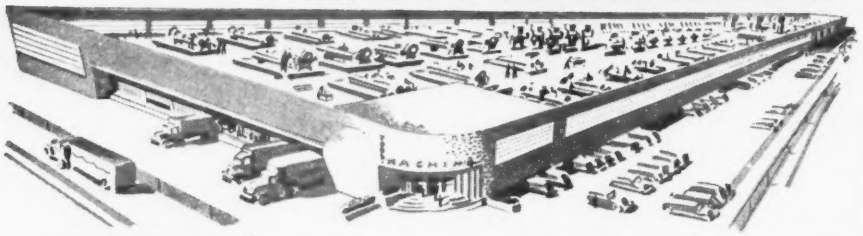
Suppliers of gas and oil fuels will gladly check your supply lines and combustion. Useful information is also available in Crucible Melters' Handbook. Write for your copy to Crucible Manufacturers Association.

CRUCIBLE MANUFACTURERS ASSOCIATION

27 WILLIAM STREET NEW YORK 5, N. Y.

CM METEOR WIRE ROPE ELECTRIC HOISTS
Capacities: ½ to 5 tons

OVERHEAD SPACE could raise PLANT EARNINGS



FEATURES

that make the METEOR preferred by Production Executives

- Only 110 volts at push button control
- Low headroom
- Balanced design
- Single and two speed models
- Motor thermal protection
- Compact, enclosed construction
- Safety type hook blocks
- Airplane type cooling
- Helical gears for long life
- Precision bearings

Getting maximum production from already crowded schedules calls for most efficient use of floor space... and overhead space too. That's where CM Meteor Hoists offer real help. By moving materials overhead, you can take better advantage of floor space for production operations and attain greater speed and safety in handling. Worker efficiency is improved. Designed for continuous duty even under dusty, moist, steam or acid fume conditions dependable Meteor performance keeps production flowing smoothly. Available with plain, geared or motor driven trolleys.

METEOR Catalog No. 142 shows all details of hoist suspension, operation and construction. Sent on request. Prices included.

CM HOISTS AND CHAIN

CHISHOLM-MOORE HOIST DIVISION
COLUMBUS McKINNON CHAIN CORPORATION
TONAWANDA, NEW YORK
DISTRICT OFFICES: NEW YORK, CHICAGO, CLEVELAND
In Canada: McKINNON COLUMBUS CHAIN LIMITED, ST. CATHARINES, ONTARIO

(Concluded from page 10)

few years ago as a horrible example of the industrial scene. Take for example, the following from a description of a new mechanized foundry: "Back in pre-automation days foundrymen worked in a choking red haze that billowed from melting cupolas."

Another publication used the following lead paragraph in an article headed "Automation for the Foundry": "Modern industrialists compare the old-style iron foundry with a Siberian salt mine. About the only difference worth noting is that the foundry was ferociously hot. Productivity was low; jobs were dirty and back-breaking; working conditions were among the worst in industry."

Surely these publications, both of which seek circulation among foundrymen, could find it possible to do away with the yellow journalism type of treatment for this basic industry.

—o—

Enterprise: But not all publicity is derogatory, as is proved in an item in the Nov. 10 issue of the *Lewiston Evening Journal,* Lewiston, Me.

Well-Named

The Enterprise Brass & Foundry Co., Lewiston, was well named.

The foundry's plant was wrecked by fire last month.

A new fire-proof building is being erected.

Not an hour's work has been lost by employes despite the fire loss.

Arrangements were made to use facilities of a foundry in Mechanic Falls. Orders were met.

Employes not on regular jobs were working on the new factory.

That's enterprise.

—o—

More To Come: A short time ago the entire staff of FOUNDRY spent two days at the home office in Cleveland making plans for many of the services this publication expects to provide the great castings industry during 1954. Some of these special features, including a directory of trade names of machinery and supplies used by foundries, and the inventory of foundry equipment, now are in the works and will be announced in more detail shortly. Others will come along as the year proceeds. After listening to the staff meeting for two days, I am sure that everyone has very much in mind the problem of making the 12 issues of 1954 even better than those you received during the year just closed.

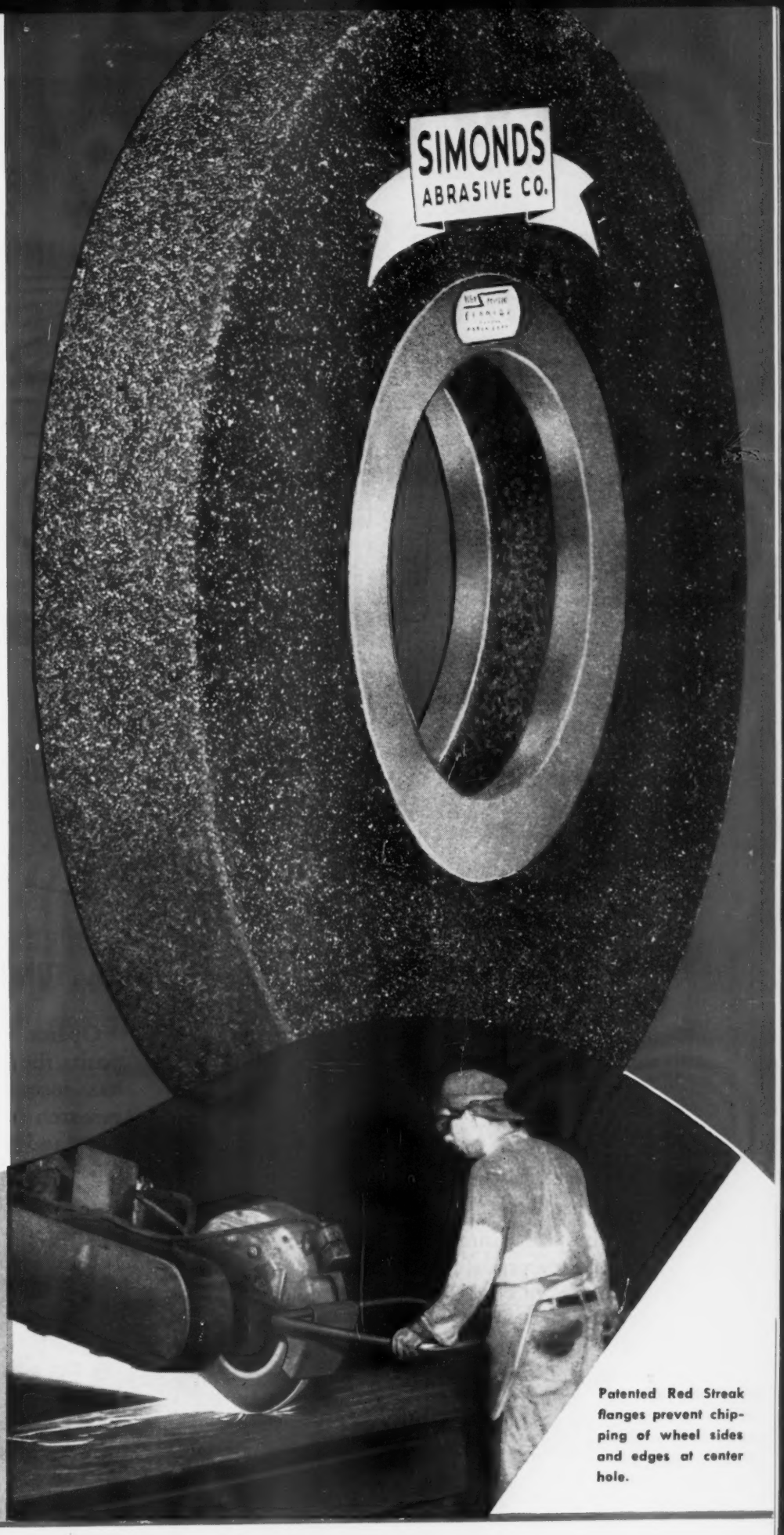
F.G.S.

any way you look at it . . .

SIMONDS

RESINOID BONDED GRINDING WHEELS

with RED STREAK FLANGES save money in high speed snagging



Tonnage ground! Wheel cost! Wheel life! From any cost-saving angle this wheel has it. Less wear on mount centers. Better balance, truer running for exceptionally fast stock removal. A Simonds exclusive for new efficiency on high speed snagging operations. Write for bulletin ESA-62.

Patented Red Streak flanges prevent chipping of wheel sides and edges at center hole.

SIMONDS ABRASIVE CO.

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DIVISION OF SIMONDS SAW AND STEEL CO., FITCHBURG MASS. • OTHER SIMONDS COMPANIES. SIMONDS STEEL MILLS, LOCKPORT, N.Y., SIMONDS CANADA SAW CO., LTD., MONTREAL, QUEBEC AND SIMONDS CANADA ABRASIVE CO., LTD., ARVIDA, QUEBEC

Foundry Alloys

offered by

FERRO-BORON
BORON DEOXIDIZERS
BORIDE DEOXIDIZERS

FERRO-MOLYBDENUM
MOLYBDENUM OXIDE
RARE EARTHS

FERRO-TUNGSTEN
MOLYBDENUM AND TUNGSTEN METAL POWDERS

CHEMICALS OF MOLYBDENUM . . . TUNGSTEN . . . BORON

Molybdenum is now available in unrestricted supply to improve strength and machinability. Dependable results are still one of its major attributes.

Tungsten, for hardenability and wearability improvement is now used in surprisingly small additions, with great success.

Boron, as an intensifier of the effects of other alloying materials, may be used in very minute additions, and yet maintain the essential properties of the castings desired. The most economical and satisfactory form to introduce Boron is recognized to be found in MCA's Ferro-Boron.

Operating the world's largest rare earth deposits, the Molybdenum Corporation of America has recently conducted extensive pioneering research in evaluating the properties, applications and uses of RareMeT Compound.

In nodular iron, small additions of rare earths have helped to produce consistently good ductility by counteracting subversive elements such as lead and titanium.

Write today for free Progress Report Number 1, "Rare Earths in Melting."

MOLYBDENUM
CORPORATION OF AMERICA
Grant Building **Pittsburgh 19, Pa.**

Offices: Pittsburgh, Chicago, Detroit, Los Angeles, New York, San Francisco
Sales Representatives: Edgar L. Fink, Detroit; Brumley-Donaldson Co., Los Angeles, San Francisco
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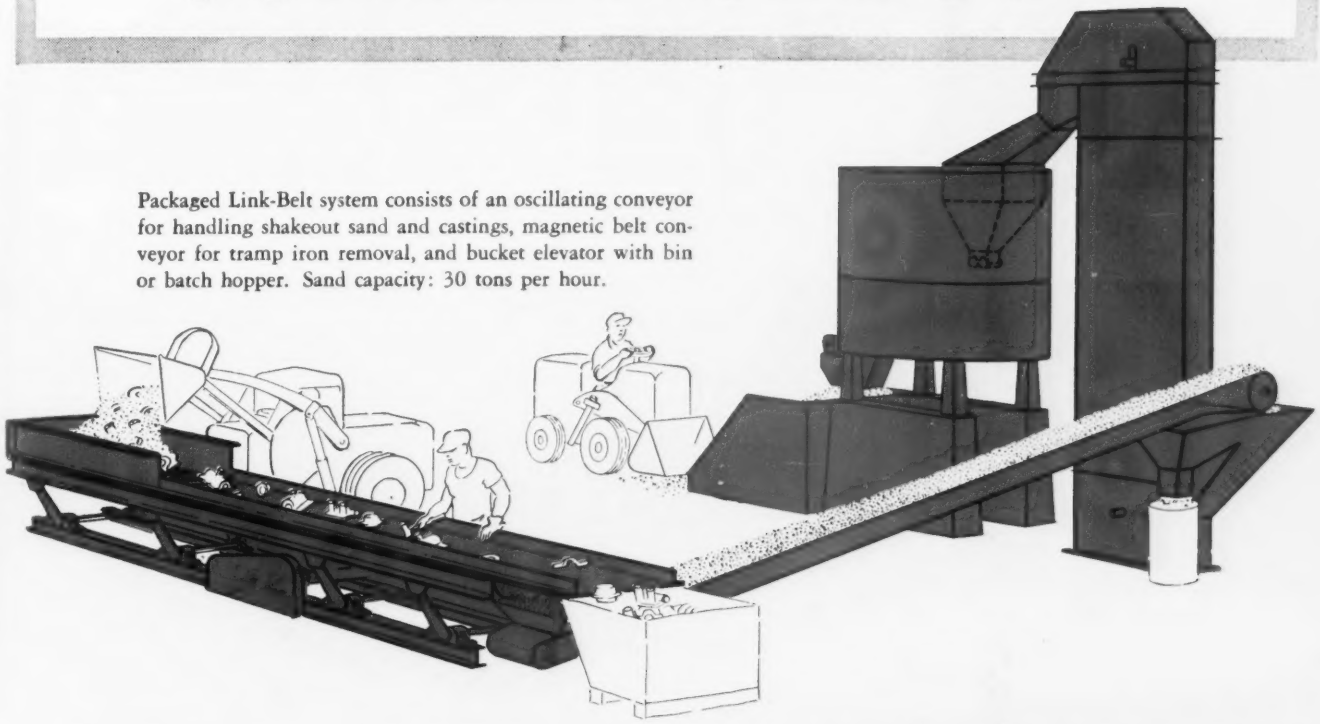
MCA

Now small foundries cut costs

with pre-engineered, packaged sand preparation and casting handling system

Packaged Link-Belt system consists of an oscillating conveyor for handling shakeout sand and castings, magnetic belt conveyor for tramp iron removal, and bucket elevator with bin or batch hopper. Sand capacity: 30 tons per hour.



LINK-BELT combines ruggedness, compactness and low cost in a modern, mechanized unit

IF you have less than 100 employees in your foundry, here's the ideal answer for increased output of better castings . . . at lower cost. Link-Belt has applied its broad experience in foundry handling problems to produce a compact, pre-engineered system that revolutionizes small foundry casting operations. It means "big foundry" organization and efficiency, regardless of the volume of your production.

Through modern sand control, this unit will quickly pay its way by reducing labor costs and improving casting quality. Equally important, systematic handling of sand and castings assures better working conditions and a cleaner foundry . . . eliminates wasted floor space.

Whether your foundry is large or small—gray iron, steel, malleable or non-ferrous—Link-Belt engineering and equipment fill the bill. A foundry specialist will be glad to work with you or your consultant. Your nearest Link-Belt office welcomes the opportunity to give you complete information.

Link-Belt Oscillating Conveyor has perforated trough at feed end to act as shakeout section and plain section of trough for spruing and sorting of castings. Air cylinder operates damming gate between sections to hold back castings for proper shakeout action.

13,278

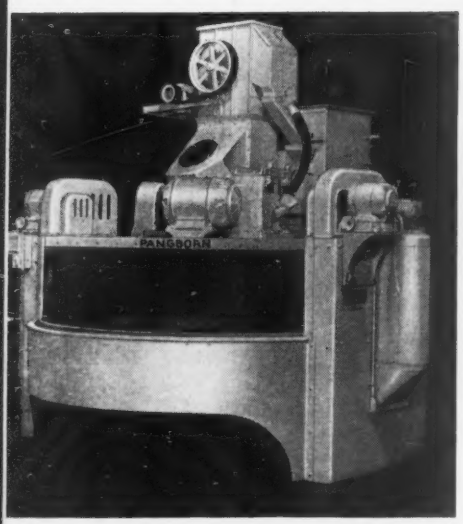
LINK-BELT

CONVEYORS AND PREPARATION MACHINERY

MEMBER FEMA

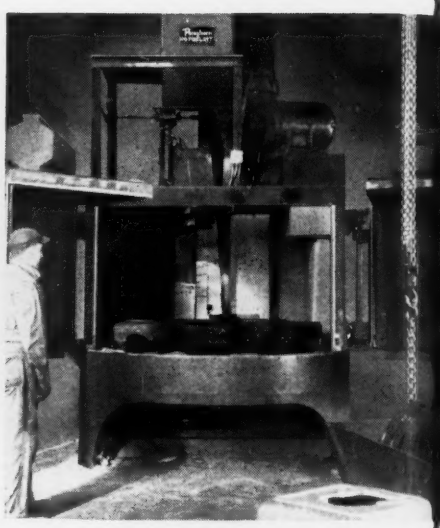
LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle; Scarboro, Toronto and Elmira, Ont. (Canada); Springs (South Africa); Sydney (Australia). Sales Offices in Principal Cities.

8 Ways Pangborn
and You--Time,

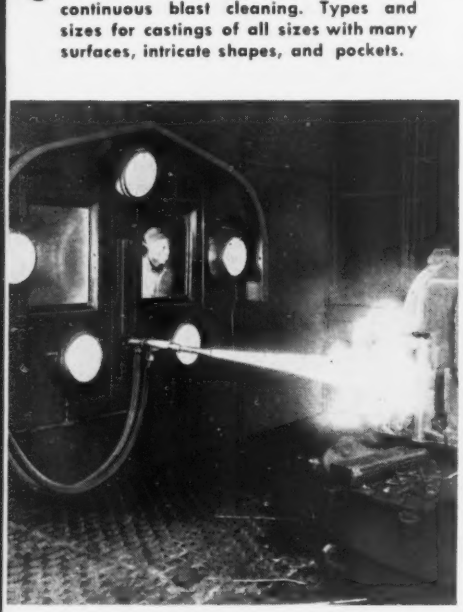


● Pangborn ROTOBLAST® Tables for semi-continuous blast cleaning. Types and sizes for castings of all sizes with many surfaces, intricate shapes, and pockets.

● Pangborn Turnstyle Tables allow simultaneous loading and cleaning as one of two tables is always in blast chamber. For general blast cleaning.

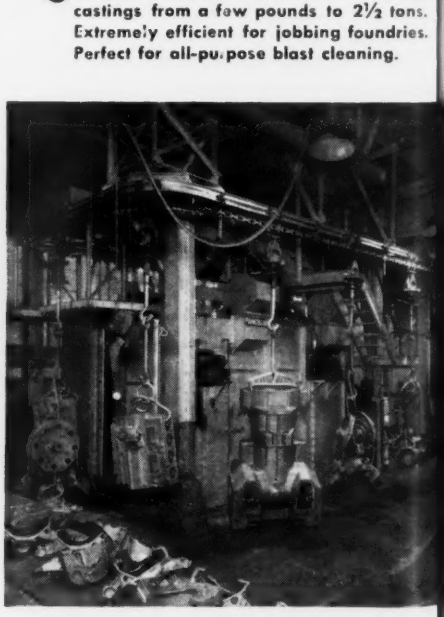


● Pangborn ROTOBLAST Tab'e-Rooms clean castings from a few pounds to 2½ tons. Extremely efficient for jobbing foundries. Perfect for all-pu.pose blast cleaning.



● Pangborn Hydro-Sand Blast Rooms for simultaneous blast cleaning and core removal. Use high-pressure stream of sand and water operated from outside.

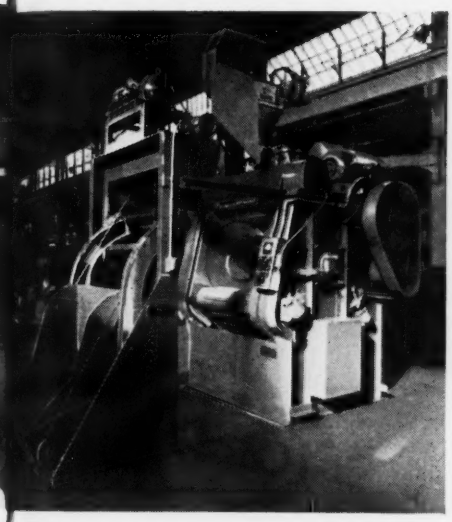
● Pangborn Airless ROTOBLAST Rooms for general blast cleaning of extra-large castings. Neither compressed air nor water is necessary. Operated from outside.



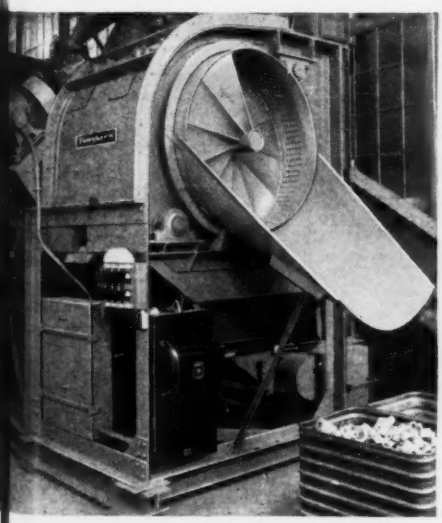
● Pangborn special equipment for unusual blast-cleaning problems. Designed only after careful study by Pangborn engineers skilled in such problems.

PANGBORN'S 50th ANNIVERSARY 1904-1954

Saves Industry Labor and Money



Pangborn Blastmaster Barrels for top efficiency in batch cleaning method. Newest addition to Pangborn line, features abrasive-tight door and automatic throw-out torque arm.



Pangborn Continuous-Flo ROTOBLAST Barrels for cleaning steady flow of miscellaneous work quickly. Operated by one man on production line basis.

DETROIT PUBLIC LIBRARY

HERE are just eight of the many types of standard Pangborn Blast Cleaning and Dust Control machines serving industry. For nearly half a century, Pangborn engineers with "know how" have been helping foundries save time, labor and money with these units as well as with specially-designed machines.

These engineers can do the same for *you!* They'll be happy to work closely with you, in recommending the exact Pangborn units you need, and in developing new equipment when necessary. No matter what *you* clean—large or small castings, fragile or intricate molds, or any combination . . . no matter what your dust problem, if dust must be collected at the source . . . it will pay you to find out how Pangborn can help you.

Send for the Pangborn bulletins that fit your needs. Just fill out the coupon below and mail to PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md.

MORE THAN 28,000 PANGBORN MACHINES SERVING INDUSTRY

Pangborn

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION MEMBER FEMA

BLAST CLEANS CHEAPER
with the right equipment for every job

MAIL THIS COUPON TODAY!

PANGBORN CORPORATION
1400 Pangborn Boulevard, Hagerstown, Md.

Gentlemen: Please send me the following bulletins:

☐ Tables ☐ Table Rooms ☐ Rooms
☐ Barrels ☐ Continuous-Flo ☐ Dust Control

Name.....

Company.....

Address.....

City.....Zone.....State.....

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

That white stuff winds up as windows

A typical example of B. F. Goodrich improvement in rubber

THAT steaming white cargo riding the conveyor belt is a special kind of salt, used in making window glass for the nation's stores, factories and homes.

As the salt travels from ovens to storage tanks, it is often 400 degrees hot. And with 1000 sizzling tons to move every day, expensive asbestos belts were burning out in seven months.

Then the company heard that B. F. Goodrich had developed a special heat-resisting rubber for belts that carry such hot materials as coke and lime. Inside the belt, B. F. Goodrich uses a rayon fabric that not only stands up under heat, but also makes a thinner, more flexible belt.

Put to work here at just half the cost of the asbestos belt it replaced, the B. F. Goodrich belt had lasted 50% longer when this picture was taken. Yet it still went on working until it reached the record of twice as much service.

Making a belt to stand terrific heat is typical of improvements made in other B. F. Goodrich belts—belts to carry materials that tear and cut ordinary rubber, stand crashing blows of dropping coal and rock, carry oily foods and grains, move packages uphill and down. B. F. Goodrich research constantly improves them all. That's why it will pay you to find out what recent improvements B. F. Goodrich has made in any rubber product you use. Call your local BFG distributor, or write *The B. F. Goodrich Company, Dept. M-149, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

Core Drying Time CUT 91%

Core measures 10 inches in diameter, 3 inches high, 2 inches thick at base.

OLD TIME—70 minutes *in conventional oven*

NOW—6 minutes *in dielectric dryer*

Fast drying is a big story, but it is not the whole story! When this core comes out of the dryer, it is cool, dry, and ready to go right to the molder. This means cores can be made only as they're needed. In many foundries hundreds of square feet of valuable floor space can be converted from core storage to productive area, by changing to *Foundromatic* core dryers.

And in addition, they give you these benefits:

- Complete elimination of overbaking or burning of cores — even cores with thin sections.
- Good core finish.
- Easy shakeout.
- Fuel savings up to 60%.

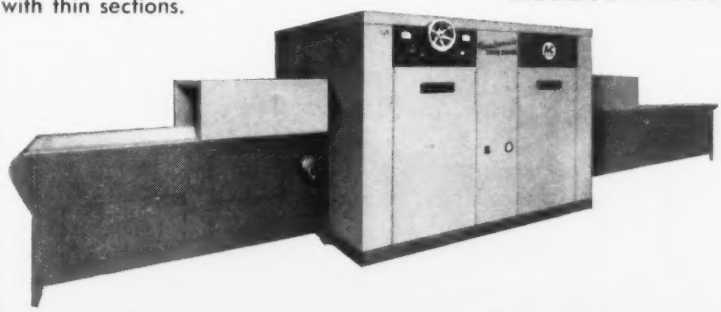
IMPROVED DESIGN

Now, new higher capacity, new compact design makes the latest *Foundromatic* core dryer a better investment than ever. Core drying capacity is increased as much as ⅓ (in the 25-kw size).

Call your nearby A-C district office for complete specifications. Or write Allis-Chalmers, Milwaukee 1, Wis.

Foundromatic is an Allis-Chalmers trademark.

A-4097



ALLIS-CHALMERS

FOUNDROMATIC *Dielectric* **SAND CORE DRYER**

QUESTIONS and ANSWERS

About Dielectric Sand Core Drying

1. What dollar savings can I expect with the Foundromatic *core dryer?*
Savings estimates of 55% to 70% have been reported.

2. Can metal dryers be used?
Yes, metal dryers can now be used with no loss of production in specific applications.

3. Is auxiliary heat needed to cure cores on metal plates?
No! By providing an insulating or non-metallic material between the core and the metal plate, cores may be cured without auxiliary heat.

4. How large a core can be dried?
Cores that will pass through an aperture 36 inches wide and 13 inches high can be dried. One foundry is drying a core weighing 950 pounds in the *Foundromatic* dryer.

5. Fuel savings of 60% are mentioned. How is this possible?
The dielectric heater delivers no power unless there is actually material between the electrodes. This means all the heat goes into the core. This makes for comfortable working conditions, too.

SEND

Allis-Chalmers
Milwaukee 1, Wisconsin

Please send me specifications on the improved *Foundromatic* sand core dryer.

Name .....

Title .....

Company .....

Street .....

City State A-4097

"I'll get to BUFFALO ANY WAY

...to get those BETTER BUFFALO PATTERNS"

Get here any way you can,
Once you do, you'll be a fan
Of pattern making super fine,
That saves you money all the time.

Our Engineers plan each detail,
Of jobs, so that we never fail
To produce equipments that really fit,
Your shop and schedule without a slip.

Fine Craftsmanship (so rare these days),
Will save you money many ways.
Scrap ratios hit some all-time lows,
And high production really flows.

On any work where you really care,
Good gravy, man, don't tear your hair,
Now you know just where to go,
Bring those fussy jobs to Buffalo.

Be our guest Just let us know when you are coming to Buffalo on pattern business. One of our cars will meet you at your plane or train and transport you to our club where you will be our guest during your stay.

Production and Experimental Pattern Equipment • Shell Mold Pattern Equipment and Engineering • Wood and Plastic Models • Jigs, Templates and Target Fixtures • Permanent Molds • Forging and Stamping Dies • Dies for Injection and Reinforced Plastics Molding • Special Precision Parts • Special Machinery and Tooling • Metallizing • Engineering Drawing Service

BUFFALO PATTERN WORKS, INC.

832 HERTEL AVE., BUFFALO 16, N. Y.

DESIGNERS AND MANUFACTURERS OF PATTERN EQUIPMENT FOR OVER HALF A CENTURY

DELTA CORE AND MOLD WASHES

FOR...

MORE PERFECT CASTINGS...

LOWER CLEANING ROOM COSTS...

LESS SCRAP IN MACHINING

IMPORTANT REASONS WHY MORE FOUNDRIES USE DELTA CORE AND MOLD WASHES TO SPEED PRODUCTION AND REDUCE COSTS

DELTA CORE AND MOLD WASHES *"Anchor" themselves by penetrating from 4 to 7 grains deep into the sand.* This bond between the wash and the sand . . . an exclusive DELTA feature . . . produces an expansion-resisting coating essential to the production of finer finished castings.

The dry compression strength increases with each degree rise in temperature up to 500°F when the hot compression strength takes over. *The hot compression strength* increases with each degree of temperature rise up to 2900°F. The ultimate hot compression strength of the wash is over 1000 lb. p.s.i.

There is no gas leakage through Delta Core and Mold washed surfaces. Gases produced by decomposition of organic binders in the core sand cannot leak through Delta Core and Mold washed surfaces to contact the molten metal. Only DELTA CORE AND MOLD WASHES provide this unique and all-important insurance against defective castings resulting from gas leakage.

DELTA

Working samples and complete literature on Delta Foundry Products will be sent to you on request for test purposes in your own foundry.

DELTA OIL PRODUCTS CO.

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

MILWAUKEE 9, WISCONSIN

CARBOFLEX

TRADE MARK

depressed center wheels

BRAND NEW... FOR FAST, SAFE

Reduce rough welds... *fast, safely!*

Remove flash from castings... *fast, safely!*

continually putting more sense in your abrasive dollar...

Finish rough edges... *fast, safely!*

Cut off or slot... *fast, safely!*

E ROUGH GRINDING AT LOW COST

Roughing? Grinding Welds? Cutting off? Slotting?—here's a great new cost-cutter by CARBORUNDUM to help you do a fast, safe job. CARBOFLEX Depressed Center Wheels are strongly reinforced for complete operator safety, yet give you an *extra-high rate of cut.*

Here are some typical jobs where CARBOFLEX Depressed Center Wheels have proved their superiority: under-cutting and reducing heavy welds, cleaning castings, roughing off fins and sharp edges, notching and cutting off gates and risers, removing surface defects, and general purpose roughing, slotting and cutting off.

An exclusive feature of the CARBOFLEX Depressed Center Wheel: the back, as well as the face, is knurled. You can cut with either side plus the edge, without initial dressing.

The right combination of tough, top-quality abrasive grain and a strong, reinforced bond is what makes CARBOFLEX Wheels so effective. Tough, durable CARBOFLEX Depressed Center Wheels combine extreme high strength and resistance to cracking with maximum cutting ability... the only combination that gives you more production per wheel at less abrasive cost.

Use CARBOFLEX Depressed Center Wheels on your toughest jobs. You'll be more than pleased with the results!

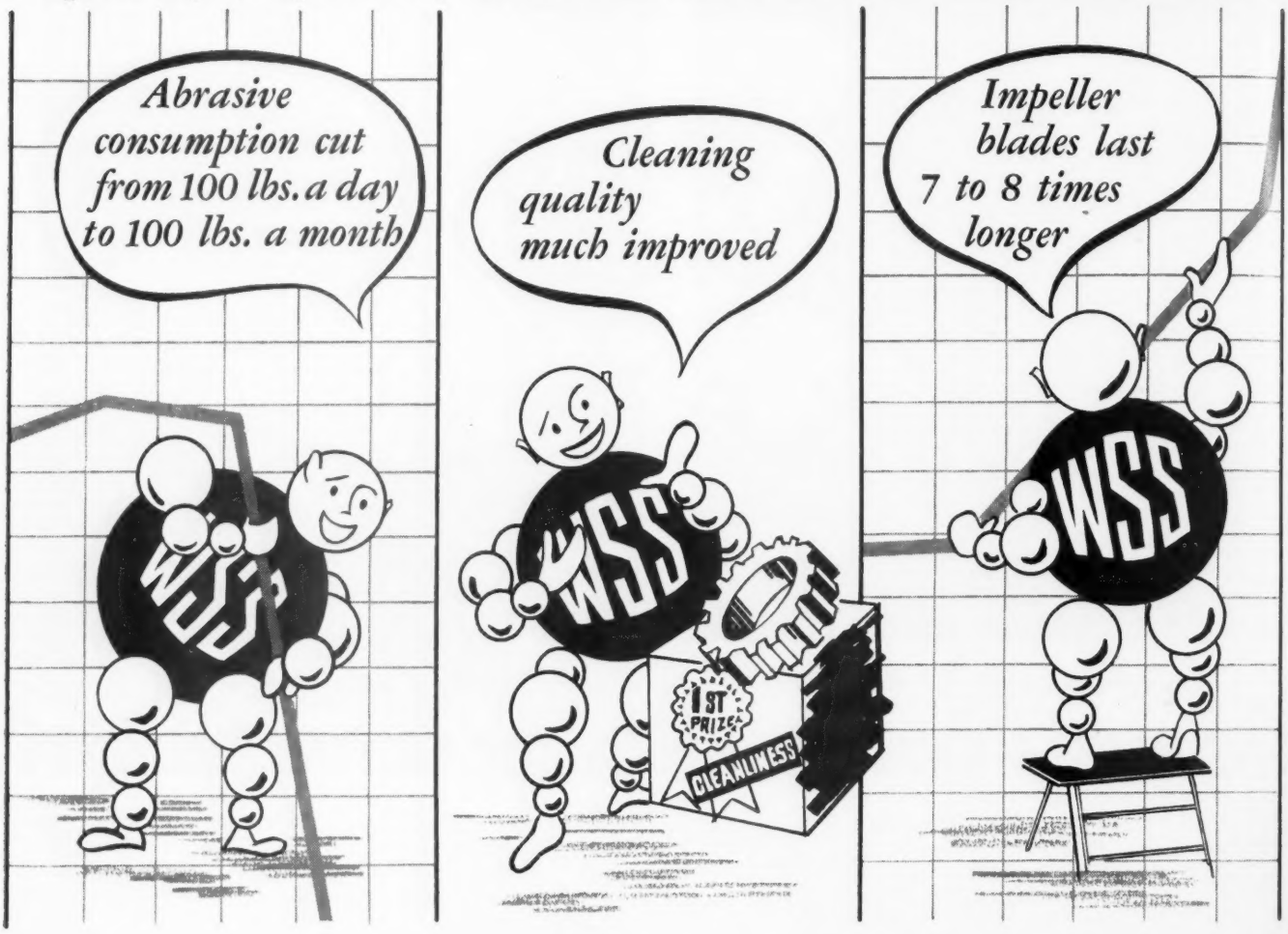
● **OUR DISTRIBUTOR OR SALESMAN** is ready to demonstrate this new cost-cutter. He's listed in the yellow pages of your telephone directory—under "Abrasives" or "Grinding Wheels." Call him... or, if you prefer, write to The Carborundum Company, Dept. F 81-41, Niagara Falls, N. Y.

CARBORUNDUM

REGISTERED TRADE MARK

81-41

pioneering developments keep WHEELABRATOR® STEEL SHOT *first in abrasives*



triple savings result from use of WHEELABRATOR® STEEL SHOT

at the FATE-ROOT-HEATH COMPANY

Thirty times longer shot life, 7 to 8 times longer blast cleaning machine parts life and much improved cleaning quality have resulted at the Fate-Root-Heath Company since they switched to Wheelabrator Steel Shot. Whereas they formerly added from 100 to 200 pounds of chilled iron shot every *day* to their machine . . . they now add about 100 pounds a *month* of Wheelabrator Steel Shot.

In addition, wheel blades now last 4 to 5 weeks compared to only 3 days with the chilled shot. The Wheelabrator Tumblast in which this superior shot is being used is operated 7 hours a day, five days a week cleaning gray iron castings weighing from ¼ lb. to 300 lbs. each.

Not only does the Wheelabrator Steel Shot last longer and reduce operating costs, it also does a much better job of cleaning. No castings are cleaned more than five minutes and most are cleaned in a three minute cycle.

"If steel shot cost twice as much as it does, it would still be the cheapest material to use," writes W. L. Chatfield, Foundry Superintendent.

Similar performance records in plants throughout the country and on every type of product prove convincingly that the lowest overall cleaning costs are achieved with Wheelabrator Steel Shot.

Try it today and see.

"6 Steps to Greater Abrasive Savings"—a new 8-page bulletin describes how your abrasive costs can be cut. Send for your copy today.

American
WHEELABRATOR & EQUIPMENT CORP.

Wheelabrator STEEL SHOT

AMERICAN WHEELABRATOR & EQUIPMENT CORP., 509 S. Byrkit St., Mishawaka, Indiana

SHELL-MOLDING PENN SAND

OFFERS YOU 7 Big Advantages

Shell Mold produced with PENN SAND at the International Foundry Show in Atlantic City.

1. WIDE SCREEN DISTRIBUTION—Produces castings of exceptional finish.

2. IDEAL A.F.S. FINENESS—Cuts costs by requiring use of less resin.

3. LOW CONFINED EXPANSION—Aids mold stability, reduces rejects.

4. UNIQUE GRAIN STRUCTURE—Gives excellent permeability, eliminates gas problems.

5. HIGH REFRACTORINESS—Facilitates pouring, prevents surface defects.

6. ABUNDANT SUPPLY—Insures immediate shipment of your orders.

7. LOW COST—Priced economically for both bulk and bagged shipments.

MAIL COUPON TODAY FOR MORE Details

PENNSYLVANIA GLASS SAND CORPORATION

Gateway Center • Pittsburgh, Pa.

Eastern Sales Office: Trenton Trust Bldg., Trenton, N.J.

Use PGS Crushed Quartzite, your best suited and least expensive back-up material.

PENNSYLVANIA GLASS SAND CORP.
140 Stanwix St., Gateway Center
Pittsburgh 22, Pennsylvania

Please send me, without obligation, more details on Shell-Molding PENN SAND.

NAME_____

FIRM_____

STREET_____

CITY_____ ZONE____ STATE_____

© 1952 Pennsylvania Glass Sand Corp.

NOW!

Palletized

Silicon Briquets

EASY TO HANDLE

EASY TO USE

A new rectangular-shaped briquet for stacking and shipping on pallets is now produced by ELECTROMET. Pallet shipments are convenient and economical to handle. The pallets hold approximately 4,000 lb. of "EM" silicon briquets and are available at no extra charge over bulk shipments. They can easily be unloaded and handled in your plant by lift truck or overhead crane. Handling time and costs are reduced and inventory-taking is simplified. The pallets are expendable and need not be returned.

"EM" palletized silicon briquets are 6 in. x 3 in. x 2 in. in size, weigh 5 lb. gross, and contain 2 lb. of silicon. The briquets are notched, so that they can easily be split in half when 1 lb. additions of silicon are desired. Because they contain an exact amount of silicon, these briquets offer close control of analysis in cupola melting operations.

Phone, wire, or write the nearest ELECTROMET office listed below for further information on how you can save with palletized silicon briquets.

The terms "Electromet" and "EM" are registered trade-marks of Union Carbide and Carbon Corporation.

ELECTRO METALLURGICAL COMPANY

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

OFFICES: Birmingham • Chicago • Cleveland • Detroit
Houston • Los Angeles • New York • Pittsburgh • San Francisco

In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet

TRADE MARK

Ferro-Alloys and Metals

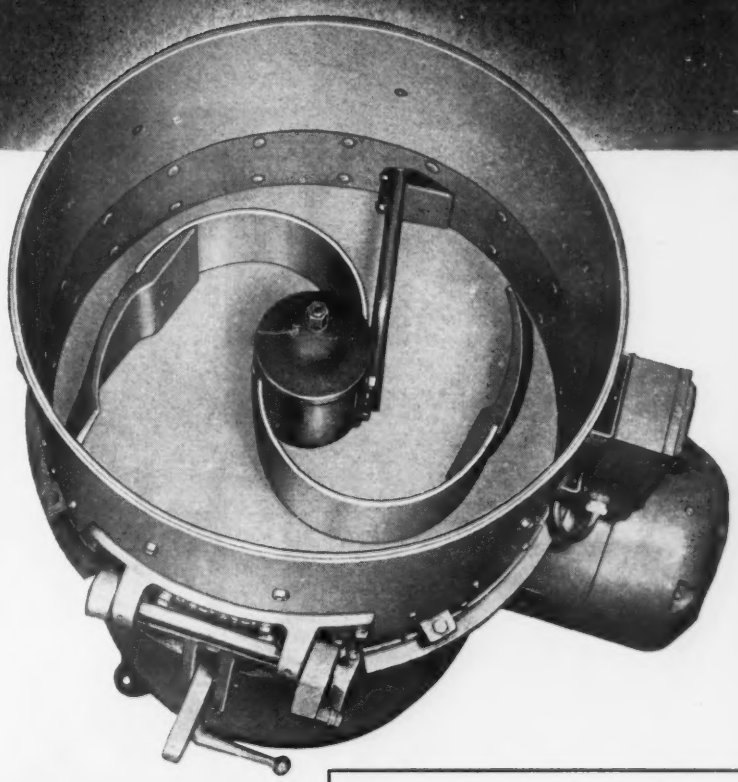
WHIRLMIX RUBBING ACTION PROTECTS SAND AS IT MIXES

• More thorough mixing *without* crushing or heating—more sand mixed per hour at lower cost—these are the big advantages provided by WHIRLMIX sand mixers.

Flexible, spring steel, whirling arms rub and squeeze sand with a regulated pressure that compensates for any variation in the amount of sand being mixed. *Correct* mixing pressure is always assured, to prevent the crushing or heating of sand grains. This exclusive mixing action produces a fluffy, well-aerated sand mixture. Because sand grains are not crushed, permeability can be maintained. Because sand is not heated, moisture can be controlled. And, because mixing is extremely thorough, a *minimum* amount of oil or cereal binders will produce maximum bond.

The whirling arms whirl sand from center to sides of the mixer, where the rubbing action takes place. Sand is firmly squeezed and rubbed between the rubbing shoes and mixer wall. Sand is squeezed upwards until it falls back into center of pan, where it is again picked up by the whirling arms to go through another mixing cycle.

WHIRLMIX mixers are easy and economical to maintain. Lower inner wall is tough, wear-resistant, synthetic rubber—bottom plate and rubbing shoes are long-wearing, high carbon steel—easily replaceable when necessary. WHIRLMIX mixers occupy little floor space, do not require foundations and are easily moved by crane or lift truck.

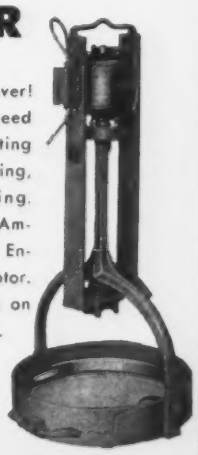


	BATCH SIZE		
	Core Oil Sand	Facing Sand	Dry Core Comp.
Lab. Model	15 lbs.	10 lbs.	10 lbs.
No. 100	100 lbs.	60 lbs.	60 lbs.
No. 300	300 lbs.	200 lbs.	200 lbs.
No. 600	600 lbs.	400 lbs.	400 lbs.
MIX TIME	3 min.	1½ min.	1½ min.

A new, 4-page, illustrated bulletin gives full particulars and specifications on all four models. Write for a copy for your file.

Discharge door, in models 300 and 600, is 28" above floor—high enough to accommodate a 3 cubic foot wheelbarrow.

FEDERAL'S LOWE SIFTER



Here's another money saver! An inexpensive, high-speed sifter with rotating-vibrating action . . . for faster sifting, better sand conditioning. Large, removable screen. Ample shovel clearance. Enclosed ball bearing motor. Write for complete data on the three popular models.

FEDERAL

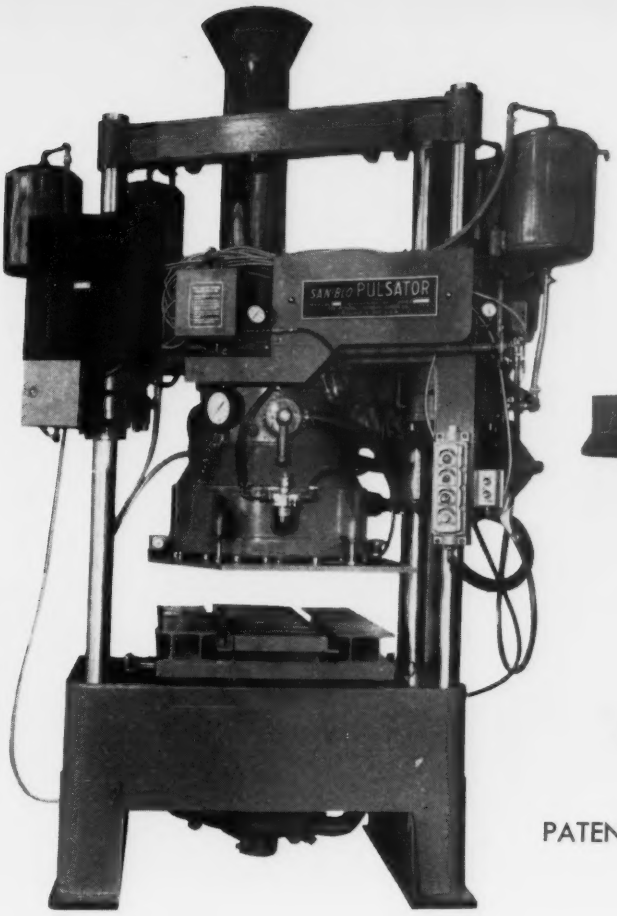
The **FEDERAL FOUNDRY SUPPLY** *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

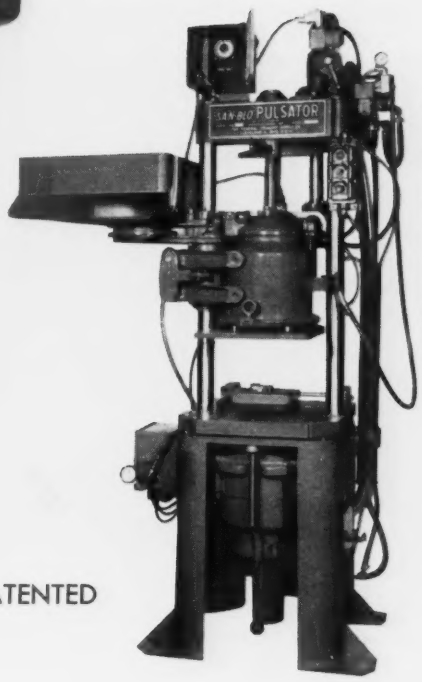
CHATTANOOGA · CHICAGO · DETROIT · LOS ANGELES · MILWAUKEE · NEW YORK

Is CUTTING COSTS your biggest problem too?

then look to SAN-BLO



Model 250P-LPP with "Pulsator" and "LPP". Blows cores weighing up to 250 lbs. in metal or wooden core boxes. Hydraulic elevator, with automatic safety lock, for raising and lowering sand magazine. Electronic controls, single button operation for automatic clamping, blowing and drawing of cores, and refilling of sand magazine. Roller conveyor available for large core boxes.



Model 40-P1-LPP with "Pulsator" and "LPP". Blows cores weighing up to 40 lbs. in metal or wooden boxes. Sand magazine refilled manually by swinging it under hopper, which is filled from floor. 6" stroke clamp - draw table. Single button control. Other models available to suit your particular requirements.

PATENTED

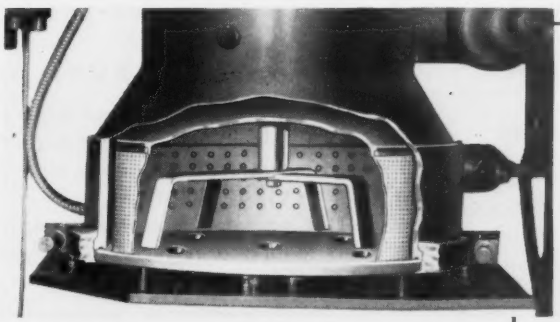
Here's the answer to your cost-cutting problem! Changing from hand-ramming to *blowing* cores can make a big dent in your production costs. And the SAN-BLO is the core blower to do it!

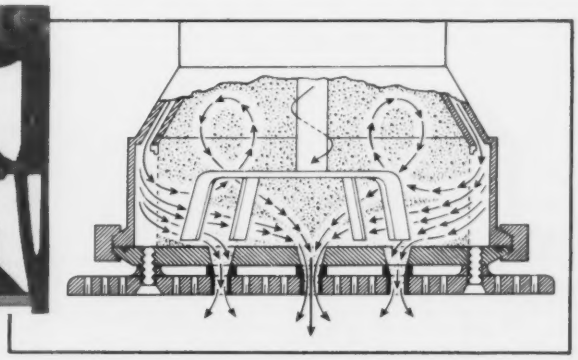
The SAN-BLO is *not* a "part time" core blower! It's designed for use every hour of the day—every day of the week. The SAN-BLO will blow *any* core sand you can hand-ram. The SAN-BLO will blow *any* core box you can fit into it—metal or wooden (well constructed, of course). The SAN-BLO will blow intricate, under-cut cores just as firmly as the easy ones. The SAN-BLO *really blows cores!*

"Mechanical-aerating action" (see below) eliminates "dead spots" and "piping" in the sand magazine and *flows* sand into the core box. "Pulsation" permits blowing *wooden* core boxes safely. "LPP" (low pressure pre-fill) holds core box wear to a *minimum*, to reduce maintenance costs.

Just two SAN-BLO model sizes for cores weighing up to 250 lbs. The "40" blows the entire range from ounces to 40 lbs.—the "250" from 5 to 250 lbs. No sand magazine changes—quick adjustment—ideal for short runs and long runs. Fully automatic—unskilled workers quickly become expert SAN-BLO operators.

So, if you're looking for ways to cut costs—look to your core room—then look to SAN-BLO. It's the all-purpose core blower that really cuts costs—in jobbing *and* production foundries!





MECHANICAL-AERATING ACTION—Photo shows the motor-driven plows in the SAN-BLO's sand magazine. They keep the blow holes covered with sand at all times—eliminate "dead spots" and "piping". Diagram shows the flow of air in the SAN-BLO's aerating air circuit. Sand in the lower section of the magazine is constantly agitated *and* aerated during the blowing cycle—until it becomes an extremely flowable, air-sand mixture that is easily and quickly *carried* by the air stream into the core box. Only SAN-BLO has "mechanical-aerating action".

Write for complete information on the SAN-BLO—the "40", the "250" or both!

FEDERAL

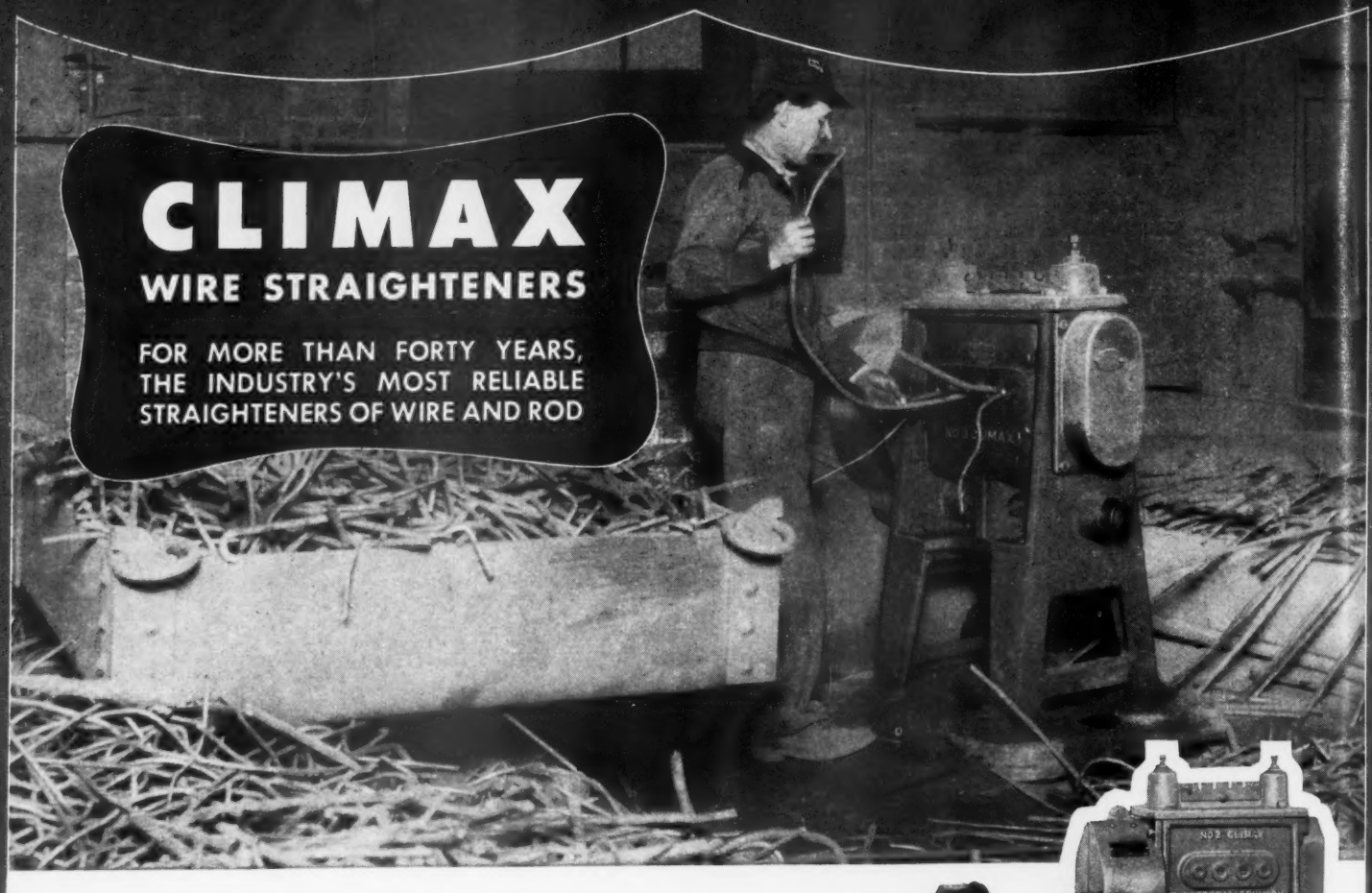
MEMBER FEMA FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION, INC.

The FEDERAL FOUNDRY SUPPLY *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CHATTANOOGA · CHICAGO · DETROIT · LOS ANGELES · MILWAUKEE · NEW YORK

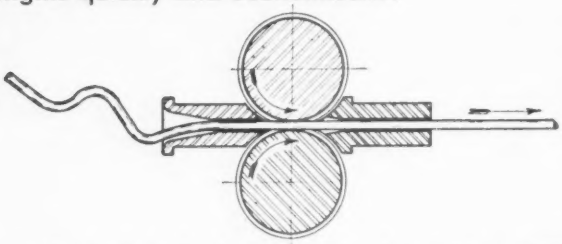
IN FRANCE—SA. PH. BONVILLAIN & E. RONCERAY, Rue Paul-Carle a Chaisy-Le-Roi, Seine



CLIMAX
WIRE STRAIGHTENERS

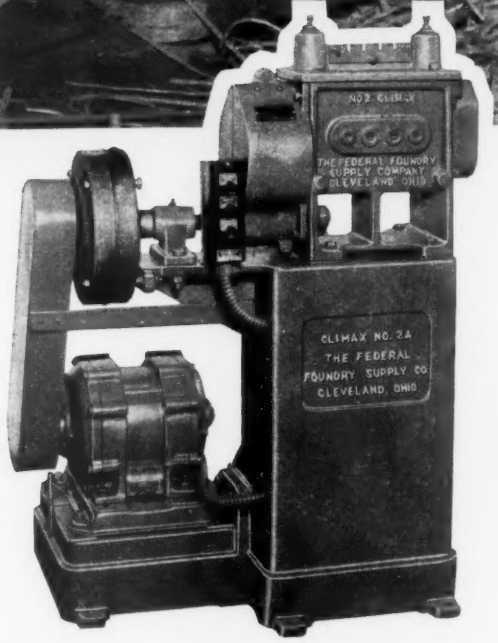
FOR MORE THAN FORTY YEARS, THE INDUSTRY'S MOST RELIABLE STRAIGHTENERS OF WIRE AND ROD

Reclaim your used core rods and wires and save money—with the CLIMAX. Operated safely and efficiently by unskilled labor. Straightens random lengths quickly and economically.



Bent wire is first checked in guide slots at top of the machine to determine proper feed hole, then inserted in feed hole, straightened between two heavy, alloy steel rolls under spring tension and ejected at back with a slight, natural bend, just right for core rod use.

Safety for the operator, as well as long life for the machine, is insured by enclosing gears and other moving parts. On motorized units, V-belts are enclosed and electrical wiring protected. Conveniently mounted controls and a reversible magnetic switch provide full protection for operator and straightening rolls, by enabling operator to stop or reverse machine instantly.


NO. 2 CLIMAX
THE FEDERAL FOUNDRY SUPPLY COMPANY CLEVELAND, OHIO
CLIMAX NO. 2A
THE FEDERAL FOUNDRY SUPPLY CO.
CLEVELAND, OHIO

MODEL 2A
motorized

Handles 4 wire sizes, 1/16" to 1/4". A complete unit, ready for operation when connected to current supply.

MODELS AVAILABLE

The CLIMAX is offered in three sizes: to handle 4 wire sizes from 1/16" to 1/4"—4 sizes from 3/16" to 1/2"—and 5 sizes from 1/4" to 3/4". Each size may be furnished in three styles, as follows:

(1) Completely motorized—ready to operate.
(2) With gear reduction unit for your motor.
(3) With extended shaft for your own drive.

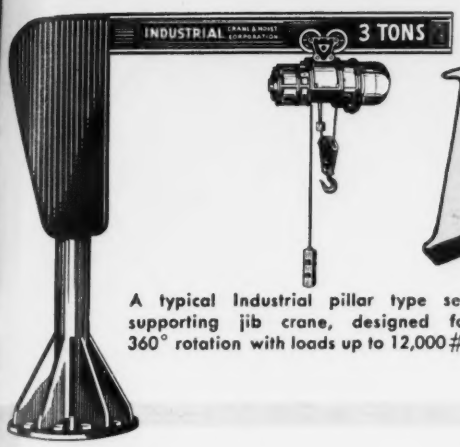
Write for additional information and prices, specifying wire sizes and model style.

FEDERAL

The **FEDERAL FOUNDRY SUPPLY** *Company*

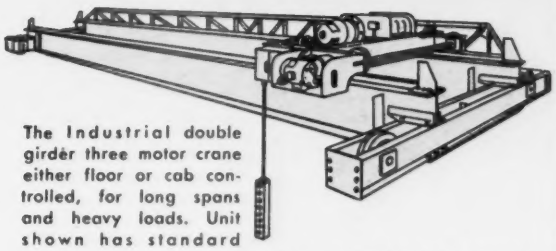
4600 EAST 71st STREET, CLEVELAND 5, OHIO

CROWN HILL, W. VA. · CHICAGO · CHATTANOOGA · DETROIT · MILWAUKEE · NEW YORK · RICHMOND · LOS ANGELES · UPTON, WYO.



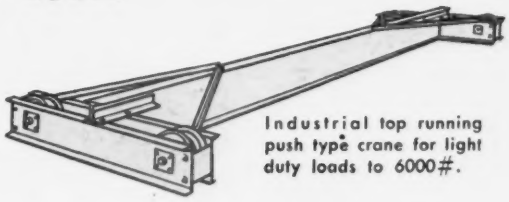
A typical Industrial pillar type self supporting jib crane, designed for 360° rotation with loads up to 12,000#.

Industrial CRANES

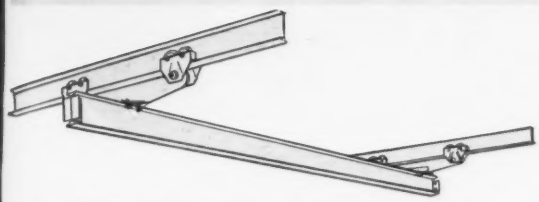


The Industrial double girder three motor crane either floor or cab controlled, for long spans and heavy loads. Unit shown has standard single outrigger; double outrigger provided for extra long spans.

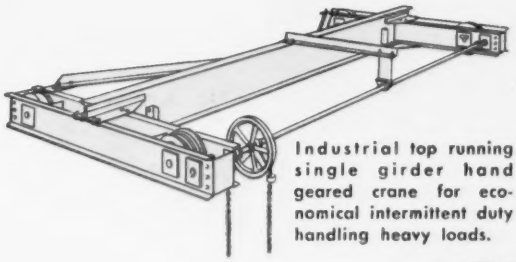
Industrial cranes are built in many types and sizes from small portable gantrys, up to 20 ton double girder motor driven overhead cranes all of welded steel construction. These cranes incorporate many patented features and are built to serve industry long and well. Consult Industrial Crane & Hoist Corporation for equipment that can simplify your material handling problems and increase your production.



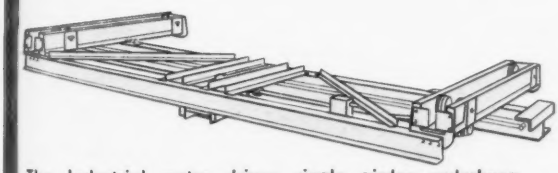
Industrial top running push type crane for light duty loads to 6000#.



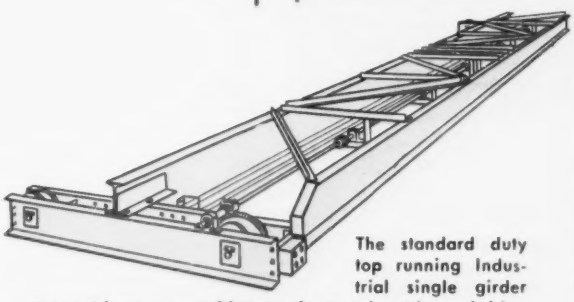
Industrial underhung push type crane for light duty—loads to 4000#.



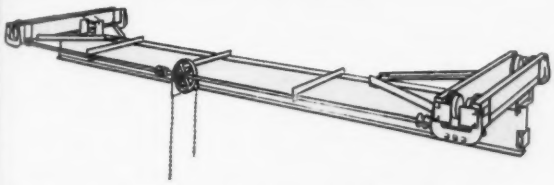
Industrial top running single girder hand geared crane for economical intermittent duty handling heavy loads.



The Industrial motor driven single girder underhung crane featuring the rigidity of outrigger construction. A standard design for loads up to 20,000#.



The standard duty top running Industrial single girder motor driven crane with typical rugged outrigger bridge construction designed to efficiently handle loads up to 20,000#.



The economical Industrial underhung single girder crane for loads up to 20,000# on intermittent duty basis.

WRITE FOR CATALOGS

Industrial CRANES

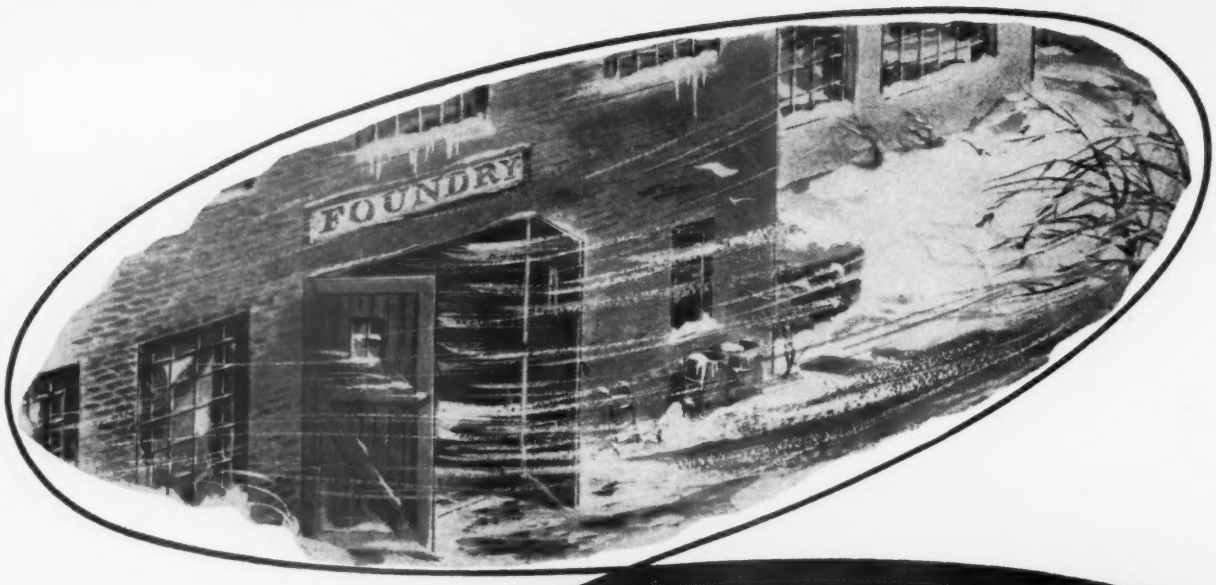
INDUSTRIAL CRANE & HOIST CORPORATION

(formerly Industrial Equipment Co.)

341 NORTH ADA STREET **CHICAGO 7, ILLINOIS**

Overhead Cranes • Jib Cranes • Monorail Systems • Crane Runways

Representatives in Principal Cities



Now is the time to check WINTER WASTE of valuable warm air!

Cold weather can be costly. A check of your foundry's Building Ventilation Balance now, may show that heat is being wasted and the comfort of employees impaired.

A Schneible BVB Dust Control System can reduce heat loss from your building by as much as 75%.

Compensating Air Uni-flo Ventilation Hoods minimize exhaust of needed building heat because each unit balances its own air intake and exhaust. These Schneible Hoods offer scientifically controlled air patterns that prevent unnecessary suction of surrounding warm air.

Check that heat loss now—check with Schneible engineers for complete control of dust, fumes and Building Ventilation Balance. Write for literature on BVB.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

SCHNEIBLE

CLAUDE B. SCHNEIBLE COMPANY

P. O. Box 81, North End Station

Detroit 2, Michigan

Late Foundry News

December 23, 1953

INDUSTRY CONFERENCES: A new system of industry conferences intended to advise Department of Commerce officials on broad policies and programs affecting business is being established in the Business and Defense Services Administration. Participants in the system will include individual businessmen as well as representatives of trade associations and business publications, who will be called in by the BDSA for consultation on specific subjects. Participants will have no formal appointment and no fixed term of office; they will serve only for the duration of a specific conference assignment, and different persons will be called in for different topics. Both large and small concerns will be represented.

Industry conferences will discuss general subjects which concern business and upon which the Commerce Department seeks information. Subjects will include legislation affecting business, taxation, labor relations, distribution problems, foreign trade relations and any other subjects not legally prohibited. Conferences for some industries already have been organized and held; others will be scheduled as rapidly as possible. The new plan is intended to supplement the industry advisory committees but will not supplant them.

ACQUIRES FOUNDRY: Control of the Ductile Iron Foundry Inc., Stratford, Conn., has been acquired by the Hartford Electric Steel Co., Hartford, Conn. Over $60,000 is being spent to install new pit type annealing furnaces, cleaning and inspection facilities and control devices. The foundry will expand production to include the 120-90-02 grade of ductile (nodular) iron in light to medium weight castings and continue current production of the 60-45-15 grade.

EQUIPMENT A "BUY": Productive equipment is currently a good "buy" in terms of price comparison of equipment with wage rates and plant building costs, according to a study by the Machinery and Allied Products Institute. It states: "The ratio between equipment prices and wage rates is 23 per cent lower than in 1940 while plant building costs are currently as high relative to wage rates as in prewar years."

ALUMINUM RECORD: Production of primary aluminum in 1953 is estimated at 1,250,000 tons, an increase of 33 per cent over 1952 output and about 330,000 tons above the wartime peak attained in 1943. The gains would have been even larger had not drought conditions hampered hydroelectric power production.

MOVING THE GOODS: The 1953 business volume of the material handling equipment builders reached $1¼ billion, according to the Material Handling Institute, which estimates that industry spent one dollar for such equipment for each 100 dollars of manufactured goods it produced.

Charles B. Elledge, General Electric Co., Schenectady, N. Y., recently was elected president of the institute for 1954. He succeeds Howard M. Palmer, Lewis-Shepard Products Inc., Watertown, Mass. Based on a questionnaire circulated by the MHI, it is expected that the next Material Handling Exposition will be held in 1956.

UNDERSECRETARY: Assistant Secretary of the Army John Slezak has been appointed undersecretary, succeeding Earl D. Johnson, who resigned to become president of the Air Transport Association. Mr. Slezak, on leave as president, Turner Brass Works, Sycamore, Ill., served in the Army Ordnance Corps in World War II, retiring with the commission of colonel. The Turner company operates a brass and aluminum foundry.

METALS DEVELOPMENT: A new metals development plant is to be built by Westinghouse Electric Corp. at Blairsville, Pa., as part of an expanding metallurgical program. The plant, to employ 200 people initially, will be devoted to metallurgical development and pilot production of special alloys and special castings. It will also produce some specialty materials for Westinghouse divisions. In addition to casting facilities, the plant will incorporate forging, hot and cold strip rolling and heat treating equipment.

MORE CAPACITY NEEDED: Additional production capacity in 68 industries covering a wide variety of raw materials and equipment still is needed, according to the Office of Defense Mobilization. Many of ODM's established expansion goals already have been met. It is estimated that 93 per cent of the goal for steel casting capacity has been subscribed for. However, only 5 per cent of the goal for heavy gray iron castings (over 3000 lb) has been met. ODM is inviting applications for accelerated tax amorti-

zation certificates in those fields where more capacity is sought.

FOUNDRY VETERAN: John A. Leisk, 80, for 16 years until his retirement in 1950 general superintendent of the foundries and pattern shops of Allis-Chalmers Mfg. Co., Milwaukee, died there Dec. 15. A native of Shetland Islands, Mr. Leisk started with Allis-Chalmers as a foundry apprentice at the age of 15 and was associated with the company's foundries for 62 years.

CAPITAL GOODS: Output of capital goods in 1953 is expected to total $58 billion, based on a study by the Council for Technological Advancement. In 1952 it was $54 billion. This includes production, transportation, distribution and servicing of capital plant and equipment. Employment is indicated as 8.2 million, far more than any other similar group of manufacturing industries; it represents about one out of every five workers employed in private, nonagricultural production.

APPRENTICESHIP COMMITTEE: Charles C. Davie, the Rumford Press, Concord, N. Y., has been appointed a new industry member to the Federal Committee on Apprenticeship, United States Department of Labor. F. J. Oerteli, Guarantee Electrical Co., St. Louis has been reappointed to the committee. Other management representatives are Archie A. Pearson, Ford Motor Co.; C. A. Putnam, Markem Machine Co., and H. E. Foreman, Associated General Contractors of America.

MISCELLANY: A survey by the American Society of Tool Engineers asserts that 28 per cent of industry's production equipment and manufacturing processes are inadequate or obsolete . . . Janney Cylinder Co., Philadelphia, has been granted a certificate of necessity covering 65 per cent of a $22,639 plant expenditure . . . Department of Commerce estimates that 1953 shipments of copper foundry products totaled 507,000 tons, against 502,500 tons in 1952 . . . Business and Defense Services Administration has moved its headquarters from the new General Accounting Office Building to the fourth floor of the Department of Commerce Building in Washington.

PRICES OF FOUNDRY METALS AND COKE

(As of Dec. 23, 1953)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE

Connellsville	$16.50-17.00

OVEN

Birmingham	$22.65
Chicago	24.50
Detroit	25.50
Erie, Pa.	25.00
Everett, Mass.	26.00
Indianapolis	24.25
Kearney, N. J.	24.00
Milwaukee	25.25
New Haven, Conn.	23.45
Painesville, O.	25.50
Philadelphia	23.95
Portsmouth, O.	24.00
St. Louis	26.00
St. Paul	23.75
Swedeland, Pa.	23.85
Terre Haute, Ind.	24.05

PIG IRON

(Per gross ton f.o.b. furnace)

	No. 2 Foundry	Malleable
Bethlehem, Pa.	$58.50	$59.00
Birmingham	52.88	....
Buffalo	56.50	57.00
Chicago	56.50	56.50
Cleveland	56.50	56.50
Everett, Mass.	63.00	63.50
Fontana, Calif.	62.50	....
Geneva, Utah	56.50	....
Granite City, Ill.	58.40	58.90
Lone Star, Tex.	52.50	52.50
Neville Island (Pittsburgh)	56.50	56.50
Steelton, Pa.	58.50	59.00
Swedeland, Pa.	58.50	59.00
Toledo, O.	56.50	56.50
Troy, N. Y.	58.50	59.00
Youngstown, O.	....	56.50

NONFERROUS INGOT

BRASS AND BRONZE: Red brass, No. 115, 24.50; tin bronze, No. 225, 35.25, No. 245, 29.50; high-leaded tin bronze, No. 305, 28.75; No. 1 yellow, No. 405, 20.75; manganese bronze No. 421, 25.25.

ALUMINUM: 99 per cent plus, primary ingots 21.50c. Secondary No. 12 alloy 19.75-20.75. Deoxidizing grades: No. 1 21.00-22.00; No. 4 17.25-18.25.

MAGNESIUM: 99.8 per cent standard ingots 27.00c, f.o.b. Freeport, Tex.

COPPER: Electrolytic 29.50-30.00c, Connecticut valley.

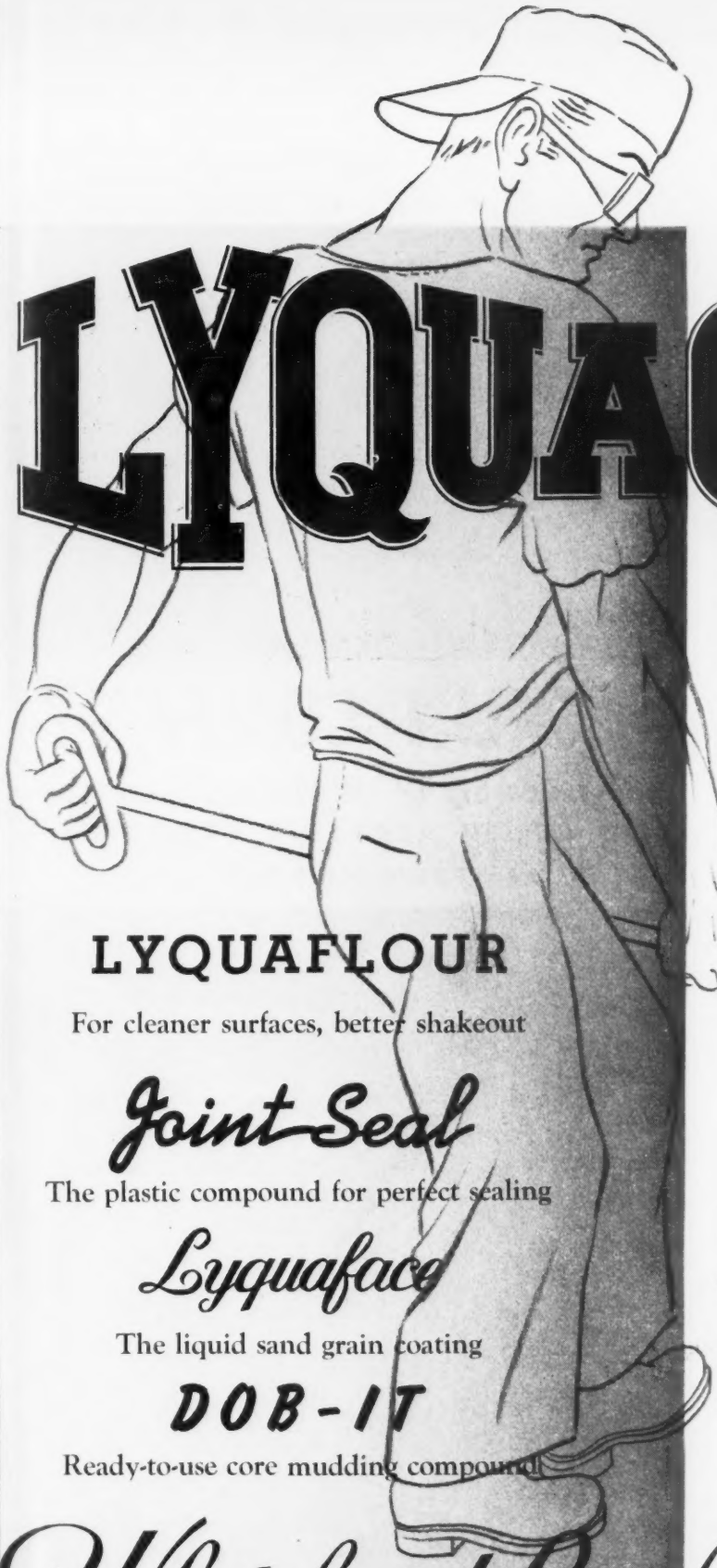
ZINC: High grade 11.35c, delivered. Die casting alloy 14.50c, delivered.

IRON AND STEEL SCRAP

(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$26.00-26.50	**$41.00-42.50	**$30.00-31.00	.....	.....	.....	$42.00-43.00
Boston*	**23.00-24.00	**29.00-30.00	.....	.....	**36.00-37.00	.....	.....
Buffalo	29.00-30.00	**32.00-33.00	.....	.....	**37.00-38.00	.....	41.00-42.00
Chicago	31.00-32.00	33.00-34.00	.....	38.00-40.00	38.00-40.00	40.00-41.00	45.00-48.00
Cincinnati*	**28.00-29.00	**37.00	**34.00	.....	**46.00	**38.00-39.00	**46.00-47.00
Cleveland	29.00-30.00	41.00-42.00	25.00-26.00	43.00-44.00	43.00-44.00	44.00-45.00	48.00-50.00
Detroit*	**25.00	**36.00	**27.00	**38.00	.....	**38.00	.....
Los Angeles	23.00	40.00-41.00	.....	.....	.....	.....	.....
New York*	23.00-24.00	29.00-30.00	.....	.....	.....	.....	.....
Philadelphia	31.00	35.00-36.00	38.50	.....	40.00-42.00	.....	.....
Pittsburgh	33.00-34.00	37.00-38.00	34.00-35.00	.....	44.00-45.00	.....	.....
St. Louis*	28.00	38.00-39.00	29.00-30.00	39.00-40.00	.....	.....	44.00-45.00
San Francisco	23.00	39.00	36.00	39.00	43.00	.....	.....
Seattle	27.00	**30.00-35.00	**25.00-32.00	.....	.....	.....	.....

*Brokers' buying prices. **F.o.b. shipping point.



Established 1841

LYQUAGRIP

An odorless, non-fermenting, economical, easy to use, ready mixed core paste, uniform at all times

1. **LYQUAGRIP**, light in color, is an extra strong corepaste.
2. **LYQUAGRIP** is odorless and non-corrosive.
3. **LYQUAGRIP** is a rapid-drying core paste at room temperatures.
4. **LYQUAGRIP** is unaffected by normal storage.
5. **LYQUAGRIP** washes off tools and hands easily with warm water.
6. **LYQUAGRIP** has no appreciable gas generation.

7. **LYQUAGRIP** pasted cores can be reheated without damaging the pasted joint.
8. **LYQUAGRIP** is unaffected by mold humidity.
9. **LYQUAGRIP** will not harm steel, brass or bronze.
10. **LYQUAGRIP** pasted joints are stronger than the core.
11. **LYQUAGRIP** cannot be overbaked or overdried.
12. **LYQUAGRIP** is uniform at all times.

You Owe It To Yourself To Investigate Our Claims

LYQUAFLOUR

For cleaner surfaces, better shakeout

Joint-Seal

The plastic compound for perfect sealing

Lyquaface

The liquid sand grain coating

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Ready-to-use core mudding compound

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Long experience, with competent engineering and research facilities, at Macklin, have provided the best grinding wheels for all types of Foundry grinding requirements.

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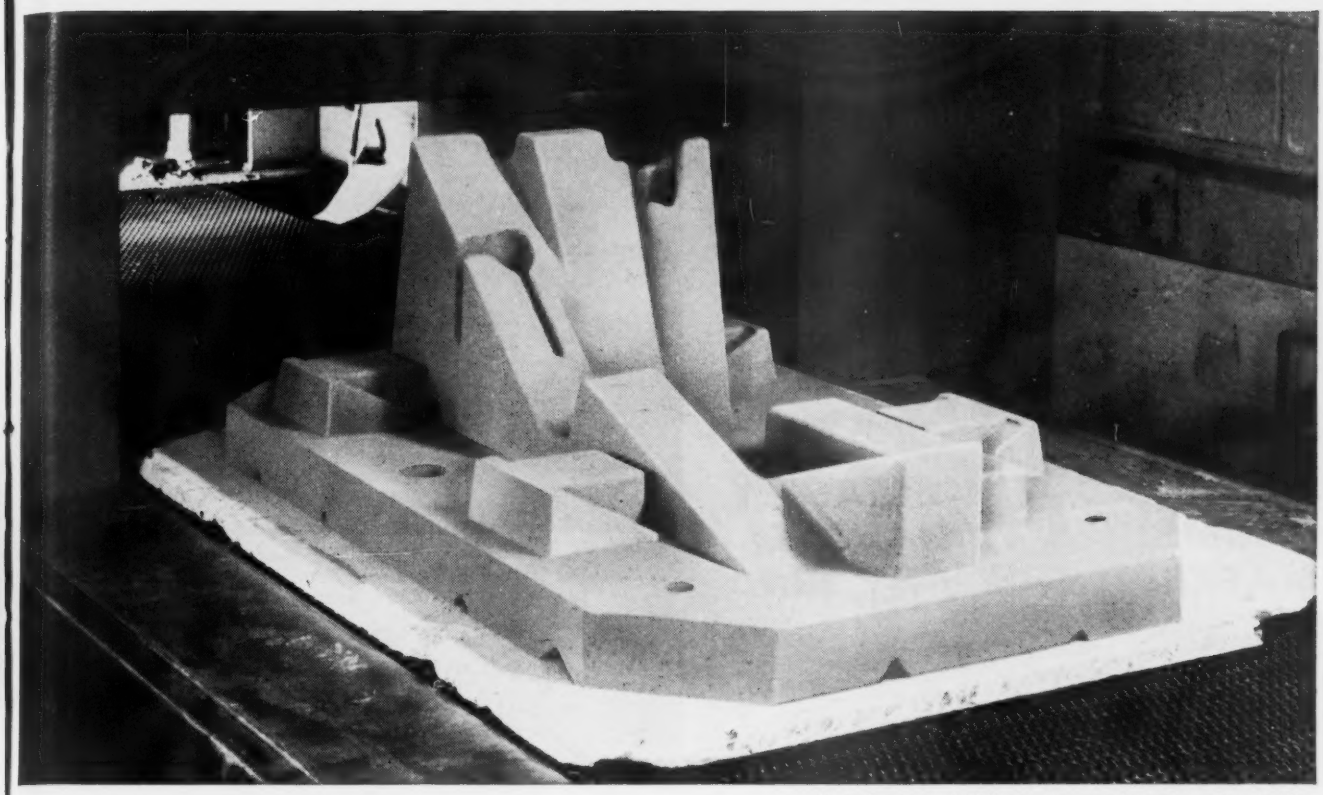

Photo Courtesy of Wollaston Brass and Aluminum Foundry Co.

New odor-free urea core binding resin

Monsanto's Resimene 970 cuts baking time up to 40 percent, compared to oil-bonded cores...

To its long list of research-built resins serving the foundry industry, Monsanto now adds Resimene 970—a new urea formaldehyde core binder that eliminates odor at the muller and core making station, and produces better baked cores in 40 percent less time.

Resimene 970 produces unusually accurate cores with sharp edges and no loose sand grains to rub off. Cores have greater over-all strength to withstand rough handling; reduce core scrap.

More than this, Resimene 970 eliminates shakeout problems and fissures . . . means less gas, greatly improved water resistance, less oven maintenance, and fewer scrap castings. Also, with Resimene 970 an underbaked core is a rarity.

If your problem is to eliminate unpleasant odors at the muller or core making station – or a production bottleneck – Resimene 970 can solve it. Why not send for full information today? The coupon is for your convenience.

Look to Monsanto for the latest research-built resins for foundry use

Core Binding . . . Foundrymen find Monsanto a ready source of a full line of phenolic and urea core binding resins. Call on Monsanto for the job-fitted resin that best meets your individual needs.

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Lytron 886 Sand Conditioner . . . Another Monsanto development for the foundry. In sand casting, Lytron 886 sand conditioner produces units with superior finish, requiring less clean-up. Lytron 886 reduces rejects, simplifies sand moisture control.

Resimene, Lytron: Reg. U. S. Pat. Off.

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CHEMICALS AND PLASTICS
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MONSANTO CHEMICAL COMPANY, Plastics Division, Room 5701,
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Please send me full information on Resimene 970 core binder ☐; Lytron 886 sand conditioner ☐; Monsanto resins for shell molding ☐, core binding ☐.

Name & Title _____

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Address _____

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MATERIALS HANDLING IN THE FOUNDRY INDUSTRY

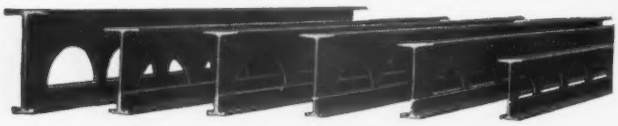
Many hundreds of foundries—grey iron—steel — malleable — brass — bronze — aluminum — magnesium — are enjoying numerous advantages possible with Cleveland Tramrail. They are speeding production and lowering costs by eliminating rehandling and providing straight-line production efficiency. They are reducing floor congestion, removing hindrances and confusion and promoting safety. In many instances, they are eliminating need of plant expansion by installing Cleveland Tramrail.

Pouring two 1000-lb. ladles simultaneously in the production of 200-lb. malleable castings. Each ladle is handled on an individual Cleveland Tramrail transfer bridge.

STANDARD ITEMS EASILY COMBINED TO HANDLE MATERIALS OF ANY KIND

Cleveland Tramrail raised-tread long-wear rail.

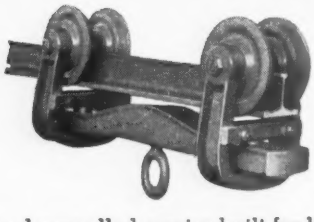
Cleveland Tramrail consists of standard items such as rail, switches, carriers, cranes, hoists, grabs, etc., which can be combined in a thousand-fold ways to serve nearly every materials handling requirement.



Cleveland Tramrail Archbeam in seven sizes for various loads and conditions.

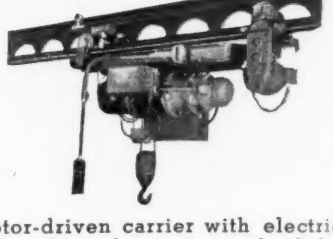
Nine 60-ton gondola cars of sand are unloaded, on an average, every 24-hour working day in a steel foundry, with two Cleveland Tramrail cranes and ½ yard grab buckets.

30,000 INSTALLATIONS



Hand propelled carrier built for long life and easy operation. Wheels have hardened tread and flange; bearings are double race type.

Backed by experience with 30,000 installations in industries of all types, Cleveland Tramrail representatives are in exceptionally good position to serve you. They will gladly advise, survey your plant, make layout or prepare quotation without obligation.



Motor-driven carrier with electric hoist. One of many types built by Cleveland Tramrail.

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THE CLEVELAND CRANE & ENGINEERING CO.
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Manufacturers of the Famous Rolled Steel Channel Foundry Flasks and Other Foundry Equipment for Almost a Half Century.

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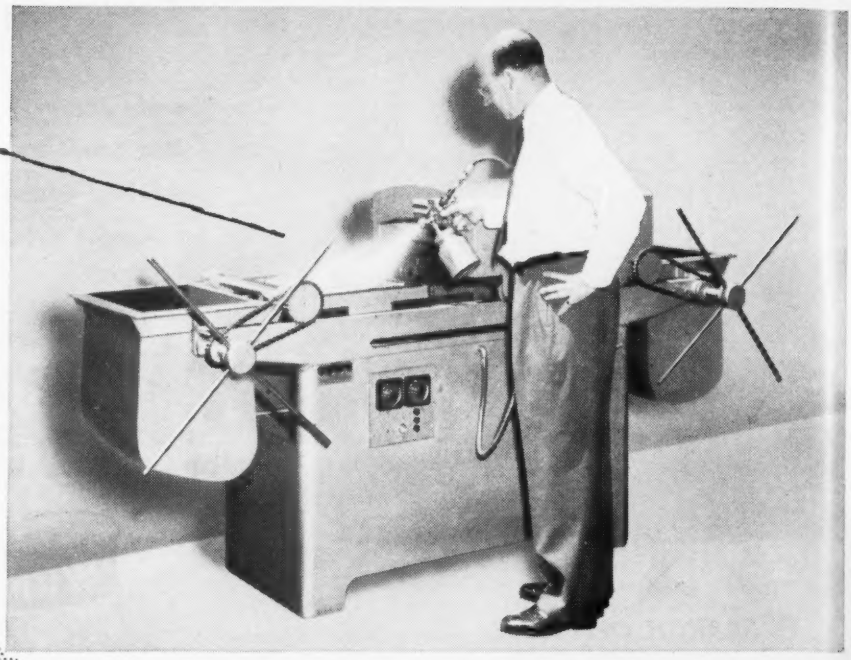
SIMPLIFY SHELL MOLDING



President Frank K. Shallenberger of the Shalco Engineering Corp., Palo Alto, Cal., applying Dow Corning 8 Emulsion to one of the two patterns on his company's machine. Twin dump boxes and a rolling oven-and-stripper assembly permit two patterns to be used at once in alternating cycles. Cope and drag production are automatically balanced. Compensating springs and geared capstans help rotate pattern and box in one continuous operation. Capacity is in the range of one 14" x 18" shell every 30 seconds.

use

DOW CORNING 8 EMULSION

. . . the NEW Silicone Parting Agent that gives you clean, positive release of shell molds and cores at lowest cost

You'll save money and minimize your production problems by specifying Dow Corning 8 Emulsion to assure fast, clean release of shell molds. This noncorrosive, nonflammable silicone emulsion cannot break down at molding temperatures to leave a carbonaceous build-up on even the most complex pattern surfaces. That reduces pattern cleaning costs to a minimum; gives you faster, more continuous production of uniformly accurate shells. And that enables you to give your customers all they have learned to expect of the shell process: uniform castings that require a minimum amount of machining.

Dow Corning 8 Emulsion can be easily diluted with hard or soft water to any desired concentration. It is highly resistant to creaming or separating in storage or after dilution. And it is available at a new low price, 8% below that of previous emulsions. For more information and a free trial sample, call the branch office nearest you or fill out and mail this coupon today.

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DOW CORNING SILICONES

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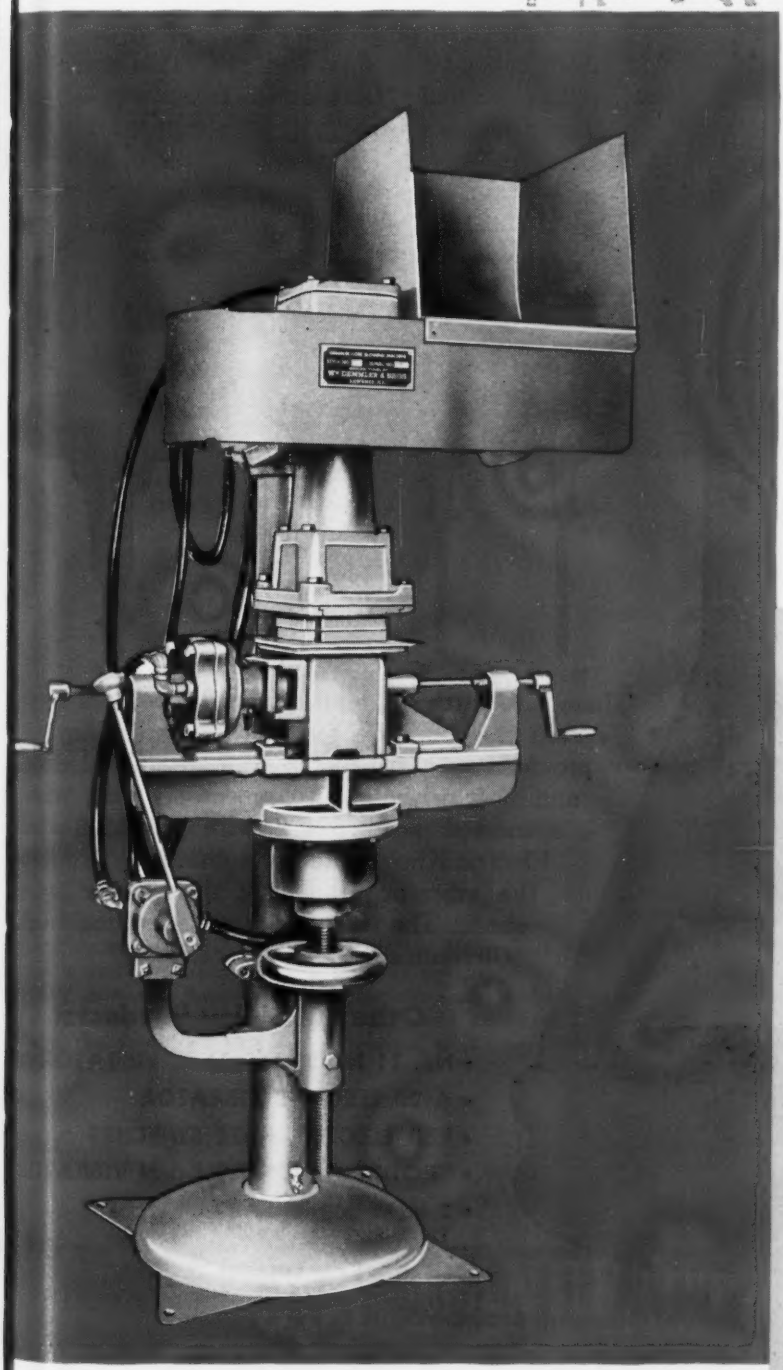
In Canada: Fiberglas Canada Ltd., Toronto In Great Britain: Midland Silicones Ltd., London

Back when the Pot-Bellied Stove was in Politics...



DEMMLER CORE BLOWERS WERE ALREADY FIRST!

Shortly after the turn of the century foundries were busy turning out castings for the pot-bellied stoves which played such an important part in the political discussions down at the General Store. And already they were looking to Demmler for new and better core blowers. Since that day, Demmler has maintained a double distinction among core blower manufacturers — first in years and first in performance records.

A LEADER TODAY...

THE DEMMLER MODEL 55

For fast, economical production on short run jobs there's no better machine on the market today than the Demmler No. 55. It is typical of the leading design which has kept Demmler out in front for 45 years. The No. 55 has one hand valve that operates both vertical and horizontal core box clamps and blows the core — all in 3 seconds! It handles cores weighing up to 4 lbs. and has a wide range of sand magazine bottom openings available to meet all your core box dimensional requirements. This model can be used for core boxes with depths up to 10". Built for profit, the No. 55 gives rugged performance at a moderate cost within the range of any foundry.

Write for literature

Wm. Demmler & Bros., Kewanee, Illinois

YOU'LL DO A BETTER JOB

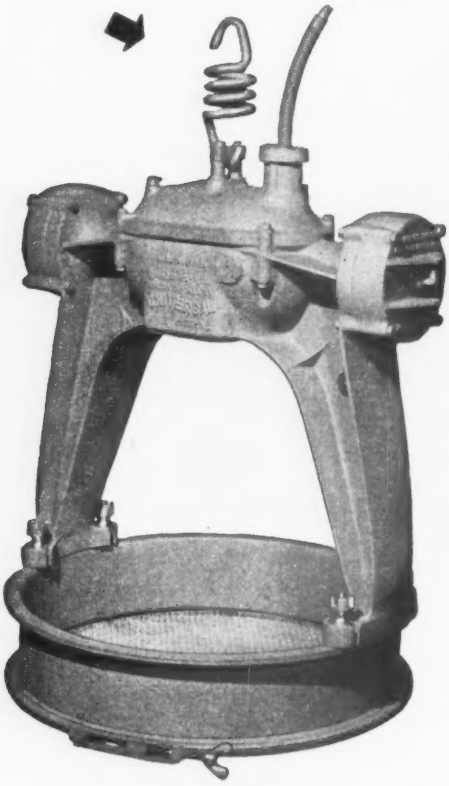
with **H. V. ADAMS DESIGNED**

HIGH EFFICIENCY FOUNDRY TOOLS

"UNIVERSAL FREE WHEELING"

FOUNDRY SAND RIDDLE

with the Double Eight Vibration

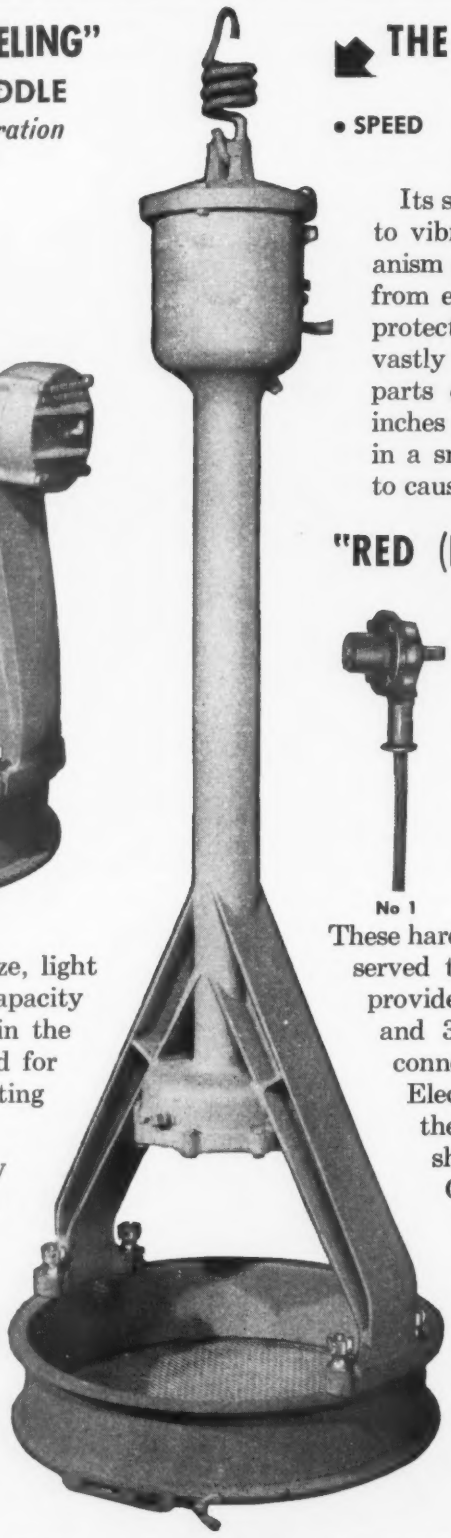


Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.



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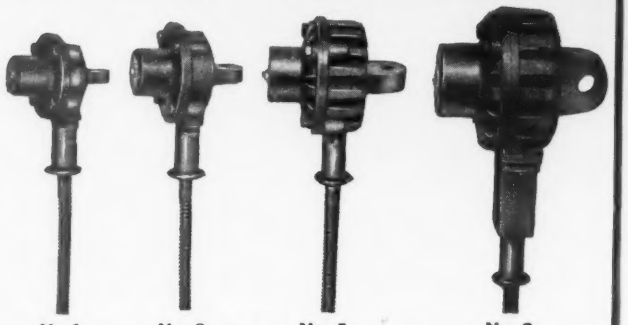
WILL GIVE YOU

- **SPEED**
- **ECONOMY**
- **SAFETY**
- **LONGER LIFE**
- **GREATER SIFTING CAPACITY**

Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area—are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

"RED (Devil) ELECTRIC" VIBRATORS



No 1 No. 2 No. 5 No. 9

These hard hitting Adams designed Vibrators have served the foundries for over 30 years. They are provided with a 6 foot 3 wire authorized cable and 3 wire grounded connector which, when connected with our 3 wire grounded Red Electric Knee Switch, automatically grounds the vibrator protecting the worker from shock. The vibrators have passed the U. S. Government code inspection.

Other Foundry Products:

- **No. 11 NOISELESS TYPE VIBRATOR**
- **A-20 ELECTRIC VIBRATOR**
- **RED ELECTRIC KNEE SWITCHES**
- **"ROTO" ADJUSTABLE BIN VIBRATOR**
- **2 MIN. UNIVERSAL FINENESS TEST SIFTER.**
- **UNIVERSAL TRIPOD CARRIER**

ORDER ALL SIFTERS AND VIBRATORS WITH GROUND WIRE!!

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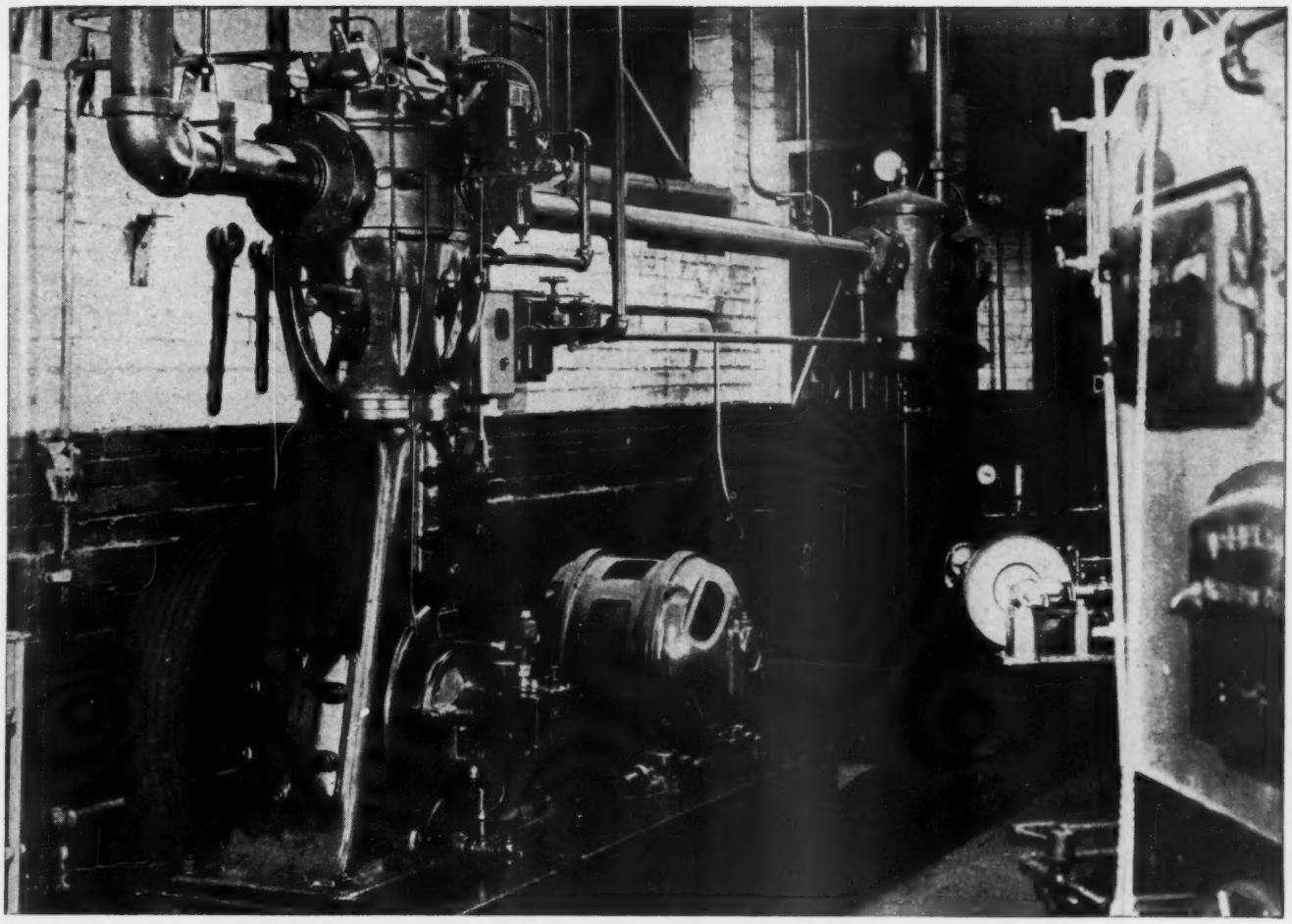
2221 Orchard Street - Chicago 14, Illinois

Established 1918 **Cable Address: "Rotoplane Chicago"** **H. V. ADAMS, Mgr.**



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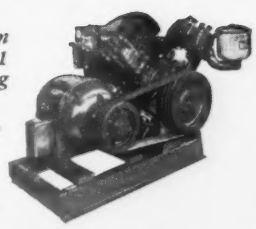
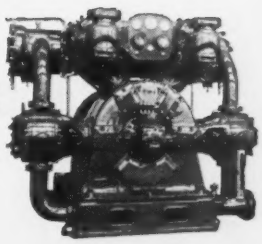
JOY WG-9 HEAVY DUTY AIR COMPRESSOR

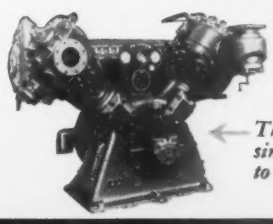
The JOY WG-9 Vertical, with its small base, saves valuable floor space. Built in a range of sizes to 881 CFM, for continuous heavy-duty service. The complete line of JOY stationary units—high and low pressure compressors, oil-free compressors, boosters and vacuum pumps—includes a type for every need, each incorporating exclusive features developed by JOY research. Supplementary products include the only complete line of vaneaxial fans and blowers, and the new JOY Oxygen Generator. ● *Write for free Bulletins.*

The JOY WL-80, in eleven sizes up to 641 CFM, with operating pressures to 125 psi.



The JOY WN-114, in single or twin units up to 7312 CFM.





The JOY WN-112, in single or twin units up to 3656 CFM.

Consult a Joy Engineer

WAD 13706

JOY MANUFACTURING COMPANY

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IF BETTER MOLDS CAN BE MADE, YOU CAN MAKE THEM WITH

NATIONAL BENTONITE

WHY IT'S FIRST CHOICE WITH MANY GOOD FOUNDRYMEN:

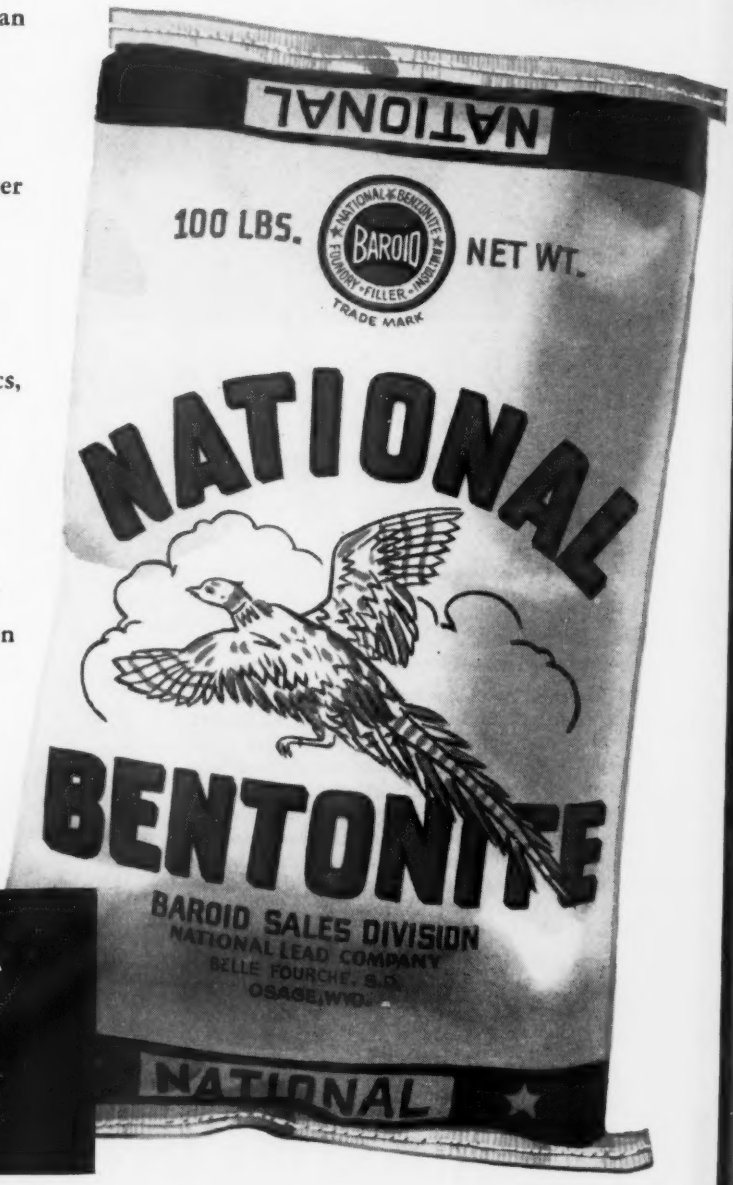
Consistently uniform high quality • Good green strength • High hot strength • High tensile strength • Yields high permeability • Provides high deformation • High sintering point • Requires least water to temper correctly • Good mold durability • Close laboratory control

Among good foundrymen, you'll find many an experienced man who prefers National Bentonite for bonding because he knows he can depend on the many properties it offers to provide a superior bond . . . which means, in terms of better production, better castings which require less time in the cleaning room.

Proper moisture control being one of the most important factors in good mold characteristics, it's always best to use a bonding material that requires the least amount of water to temper correctly. Foundrymen have found that they can control their moisture content correctly with proper proportions of National Bentonite in their molding sand. That's why so many good foundrymen say, "I can rely on National Bentonite."

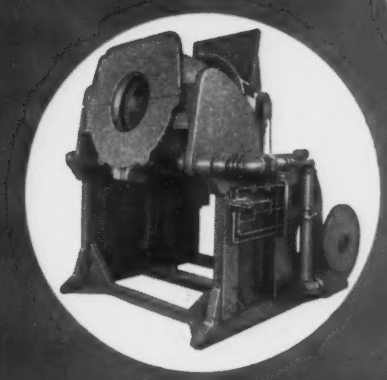
FIRST CHOICE WITH MANY GOOD FOUNDRYMEN FOR YEARS

Quick Service From Better Foundry Suppliers Everywhere

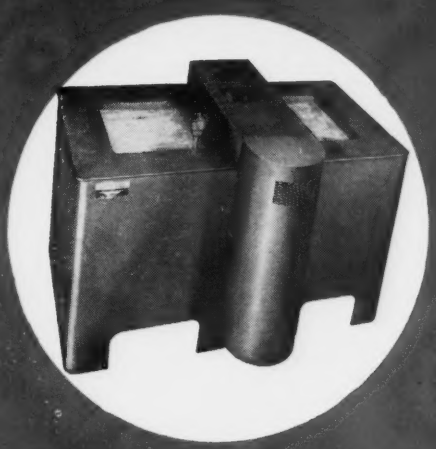


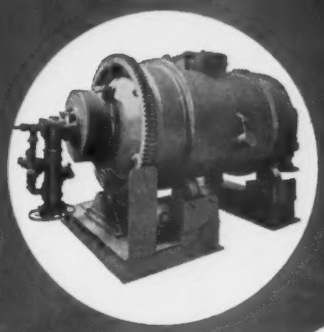
Baroid

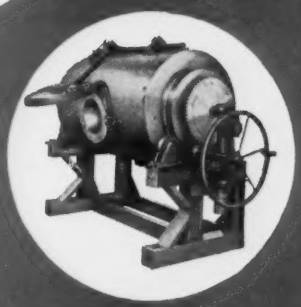
Baroid Sales Division ★ National Lead Company
Bentonite Sales Office: Railway Exchange Building, Chicago 4, Illinois

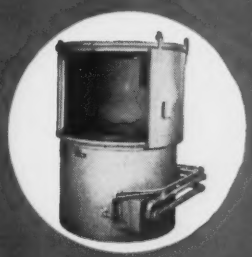


MELTING AND HOLDING FURNACES









Lindberg-Fisher builds all kinds of melting and holding equipment . . . gas . . . oil . . . electric . . . induction . . . arc and high frequency. Lindberg-Fisher engineers can intelligently and without prejudice recommend the proper type of furnace to best suit your needs and conditions.

Bulletin 551 covers the complete melting line. Write for your copy today.

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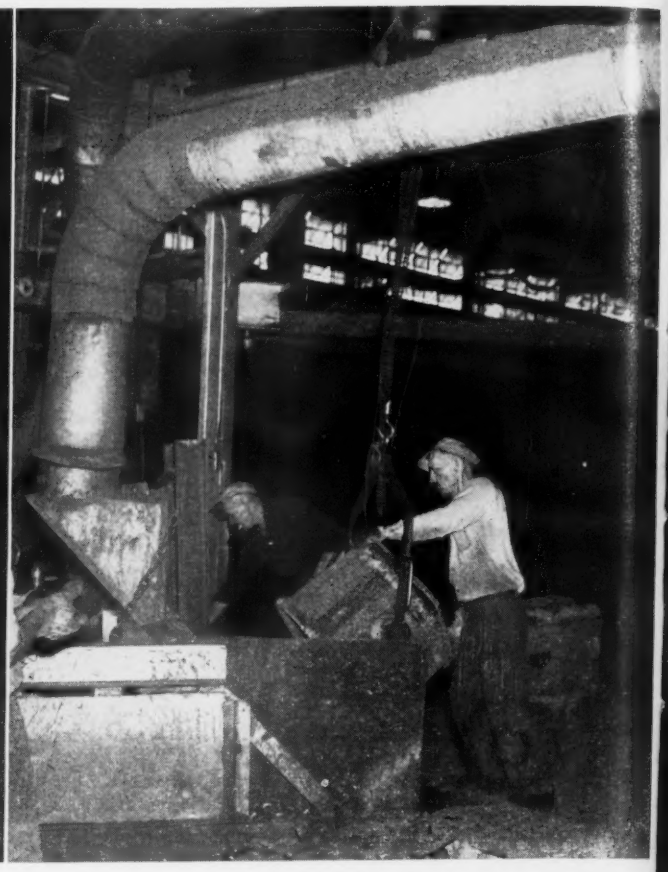
pioneering developments keep **DUSTUBE**® *first in dust control*



no dust escapes into the atmosphere

Dustube® cleans everything but the pocketbook

Dustube dust removal is thorough. At Ontario Malleable Iron Company, Ltd., a Dustube Collector is ventilating the extremely dusty operations of packing and unpacking pots in which hard iron castings are annealed. As the layers of sand and castings are added to the pots, a dust hood efficiently draws off all the dust. When sand and annealed castings are removed from the pots, the Dustube also collects the heavy volume of dust created.

Results of this installation are very satisfactory. No dust escapes into the atmosphere, working conditions are excellent and this area of the foundry is exceptionally clean—in spite of the dusty nature of this operation.

Dustube removes all the dust. Yet the Dustube is not hard on the pocketbook. It often saves its cost in a year or two. Ontario Malleable has found that maintenance and operating costs are exceedingly low. They, like other prominent foundries, have discovered that, "It Pays to Own a Dustube."

If you want dust collection that is thorough, yet economical . . . that will pay its own way . . . investigate the Dustube today.

Catalog 372 explains the reasons why Dustube Collectors control dust more efficiently at lower cost. Send for your copy now.

Write for your copy of Catalog 372 today.

American

WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St., Mishawaka, Indiana

dustube®
COLLECTORS

a good turn

for large metal patterns

This big Bullard Turning Lathe is an unusual piece of equipment to be found in a pattern shop . . . its normal habitat is the production line where volume output offsets its investment. At City Pattern it is used to machine large metal patterns because it provides accuracy at maximum economy of time and money.

This is another indication of the unusual facilities to be found at City Pattern Foundry & Machine Co. for the crafting of the finest in metal patterns and other foundry equipment. Such facilities, manned by experienced hands, are your assurance that a pattern bearing this name has been produced accurately and by the most practical and economical modern methods. These "stand-out" facilities, coupled with conscientious effort to produce the best in patterns, are the very reasons that leading manufacturers rely on City Pattern Foundry & Machine Company for patterns that stand out in use.

City Pattern Foundry & Machine Company's Shrinkage Conversion Tables save time and eliminate errors in shrinkage calculations. Your letterhead request will bring a set of these handy tables without obligation.

40th Anniversary
1913-1953

Setting the Pattern in Patterns

CITY PATTERN
FOUNDRY AND MACHINE CO.

1161 HARPER AVENUE • DETROIT 11, MICHIGAN

Here's your Rx for longer metal-melting runs...

Up to 64 Hours Continuous Service! In foundries everywhere, Norton CRYSTOLON* slag hole blocks are chalking up new records for operation without shutdown.

Norton slag hole blocks

Extra long service life . . . no softening or spalling at temperatures up to 3050°F . . . 5 to 15 times greater resistance to corrosion and erosion than you could ever get with fire clay blocks!

That's your Rx — another Norton "special refractory prescription" — for increasing production and cutting the time and trouble of your metal melting operations.

Fill that Rx by standardizing on Norton slag hole blocks. Made of CRYSTOLON refractory material — extremely dense to resist slag penetration and chemical attack — they'll give you the longest, most dependable service you can get, reducing your maintenance and replacement costs to new, profit-boosting lows!

CRYSTOLON slag hole blocks are made in shapes to meet every foundry requirement. See your Norton Representative for complete facts. Or write to NORTON COMPANY, 300 New Bond Street, Worcester 6, Mass. *Canadian Representative:* A. P. Green Fire Brick Co., Ltd., Toronto, Ontario.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

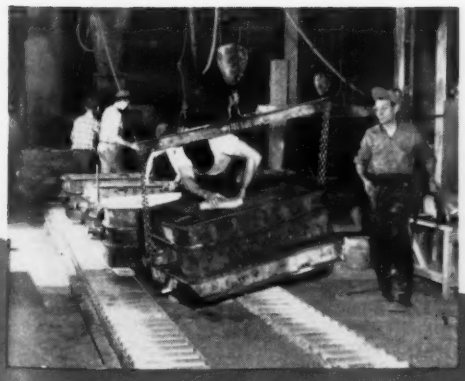
NORTON
REFRACTORIES
ENGINEERED Rx PRESCRIBED
Making better products... to make other products better
NORTON COMPANY, WORCESTER 6, MASSACHUSETTS

Russell H. Swartz, President of Riverside Foundry, says, "This battery of DAVENPORT Pin Lifts knockout molds for over 165 tons of alloy steel castings a day."

Eight DAVENPORT Pin Lifts producing cope and drag molds. Day after day this battery of DAVENPORTS are on the job meeting Riverside's tremendous production schedule.

If your production and maintenance costs are a problem—better let our engineers counsel with you.

Let us send you our new Pin Lift Bulletin #1003A.



Model 40 "AJS" Pin Lifts working with ballast conveyors.

DAVENPORT MACHINE AND Foundry Company
DAVENPORT IOWA

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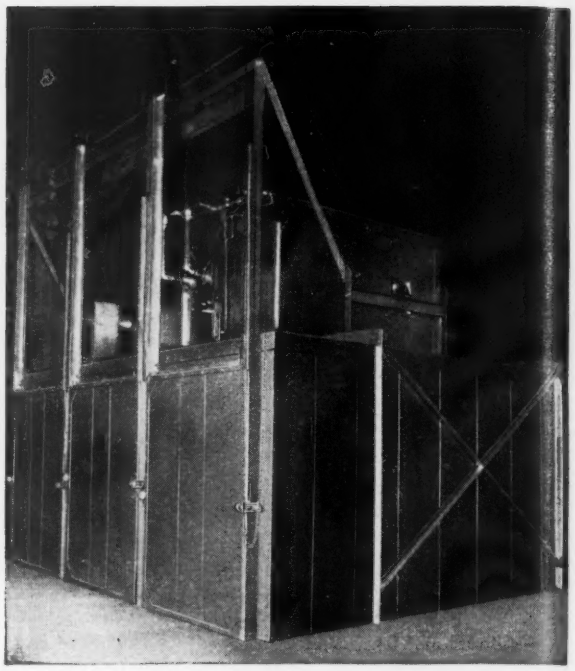
A LOT MORE THAN FANS DUCTS, HEATERS AND PANELS GO INTO . . .

LANLY FOUNDRY OVENS

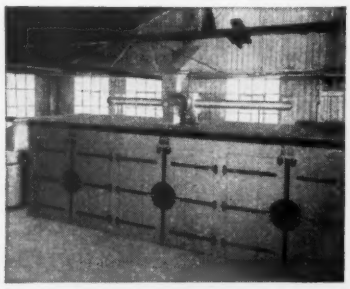
The proper adaptation and utilization of the essential component parts in every LANLY OVEN for maximum operating efficiency and economy, is a certainty being proved every day in foundries throughout the country. Specialized knowledge evolved from long experience and close cooperation with our customers enables us to design and erect better foundry ovens.

Upon receipt of information covering your needs, we will submit a proposal for an oven that will be thoroughly guaranteed as to construction and performance.



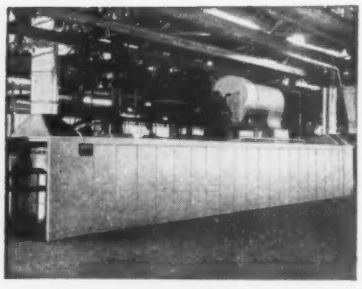
3 COMPARTMENT RACK TYPE OVEN

Uniformally heated by one compact, high capacity, air heater serving all compartments. Each compartment accommodates two core racks 4'-0" wide x 7'-0" long x 6'-0" high, loaded end to end.

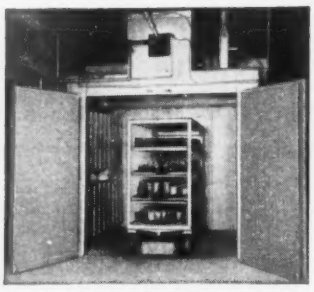


Three Compartment Rack Type Oven

Lanly Car Type Oven

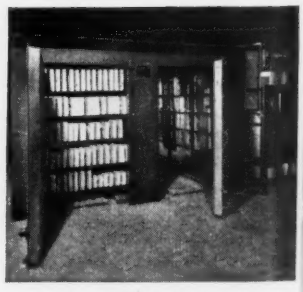


Continuous Core Blacking Oven



De-waxing Oven

Combination Rack and Drawer Type Oven

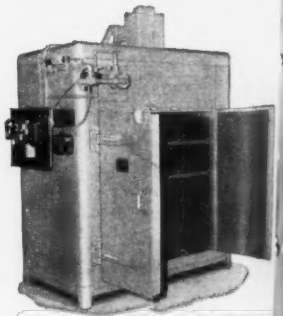


Plaster Mold Drying Oven

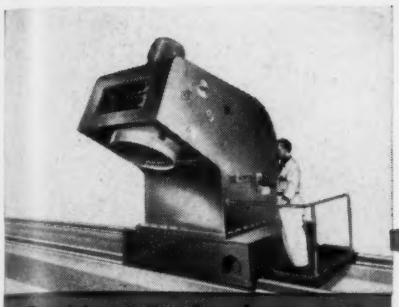
LANLY FOUNDRY OVENS

THE LANLY COMPANY • 780 PROSPECT AVE
CLEVELAND, OHIO

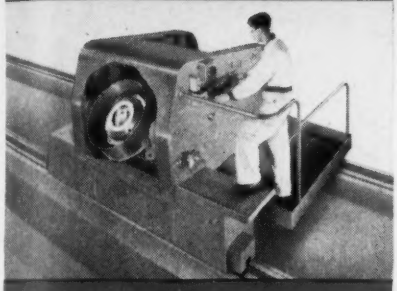
WRITE FOR THE LATEST CATALOG AND FACTS ON ANY INSTALLATION



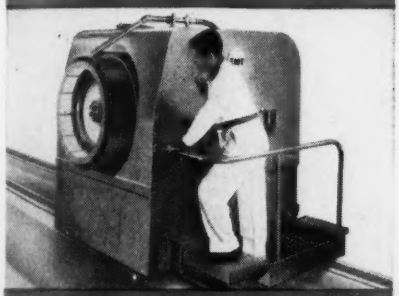
Shelf Type Core Oven



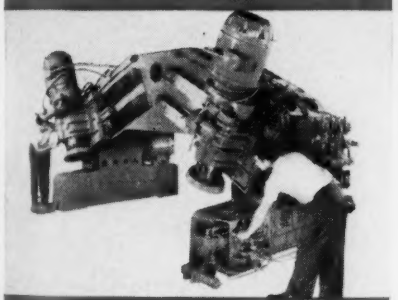
Precision roller bearings carry grinders smoothly over protected steel ways.



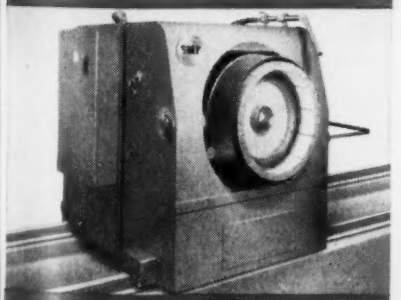
Wheels and spindle units can be changed as conditions demand.



System of electrical interlocks governs pre-determined automatic movement.



Spindle downfeed is obtained by smooth, positive hydraulic action.

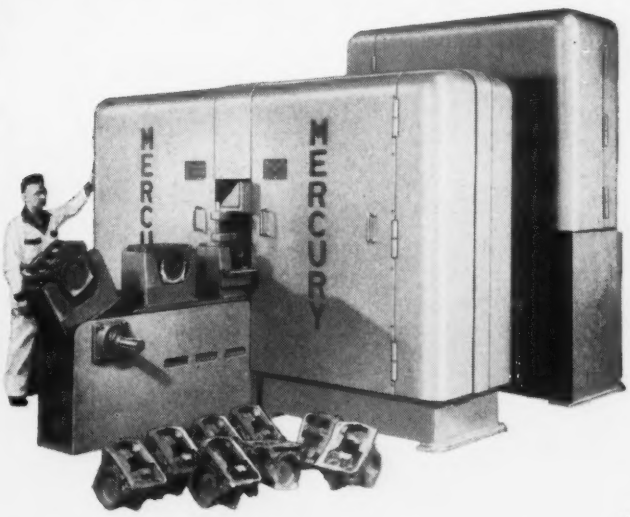


Travel distance is limited only by job conditions and shop restrictions.

MERCURY *Grinders* LEAD THE FIELD

The proven development of traveling wheel grinders has given Mercury top position in the field. These machines are available in sizes up to 150 horsepower and with wheels as large as 42 inches in diameter. Mercury Grinders travel on smooth steel ways which are laid down in sections of one-piece construction. Grinding length is unlimited with this unique, cost-cutting design.

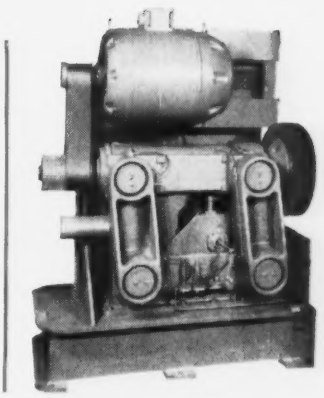
AUTOMOTIVE GRINDERS *for*



ENGINE BLOCKS
•
CYLINDER HEADS
•
MANIFOLDS
•
CRANK CASES

750 Automotive Castings Per Hour Ground on Three Sides

Many shops are setting production records in the preparation of castings for the automotive industry. Costly and inefficient manual handling is reduced to a minimum, and consistently superior finish is assured. Completely sealed for safety and protection, Mercury Automotive Grinders have simplified operation and maintenance. Available from 20 thru 100 horsepower.



Unique Toggle-Arm* action guides the wheel on the work surface. Remote control of positive hydraulic downfeed in specified increments simplifies operation.

SINCE 1933 A SYMBOL OF FINE CRAFTSMANSHIP

Write for Bulletin No. F-739

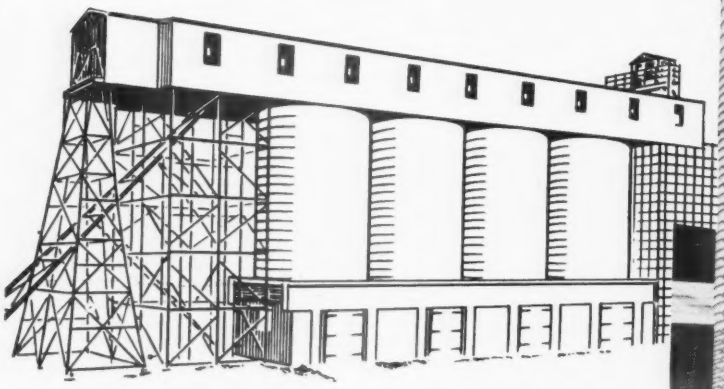
MERCURY ENGINEERING CORPORATION

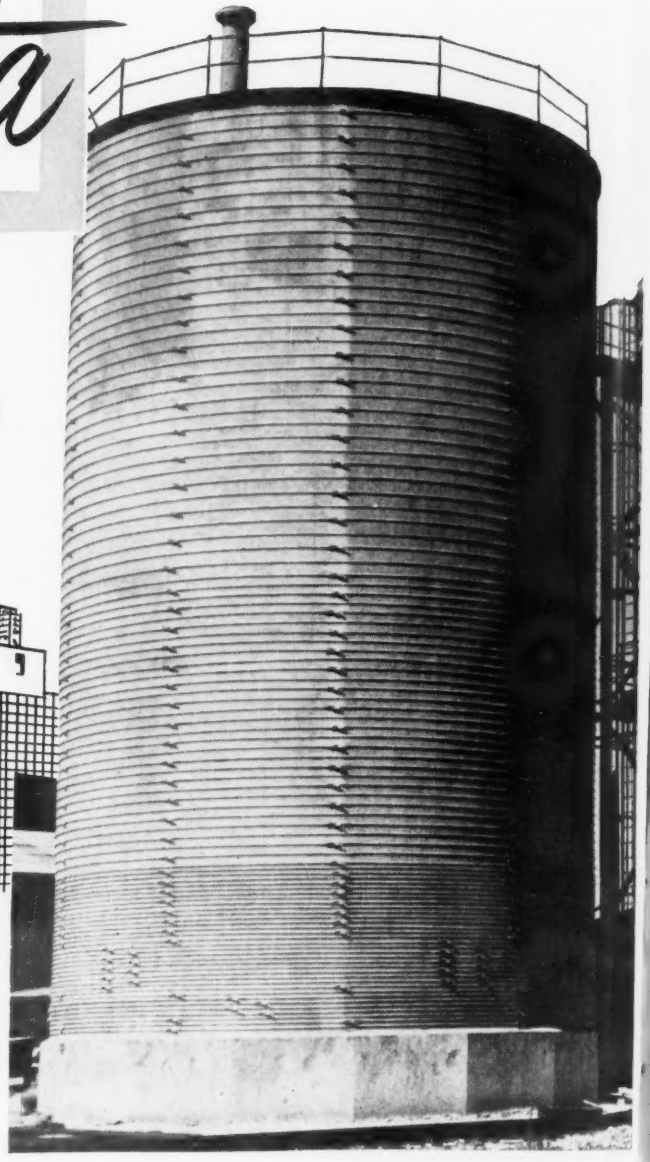
2100 N. FARWELL AVE. MILWAUKEE 2, WISCONSIN

Marietta

GREATEST NAME IN SILOS

lets you think in YEARS-AHEAD terms!





From foundation to roof, a Marietta Concrete Storage System is adaptable to every type of materials-handling.

Marietta engineers, thinking in years-ahead terms, have long recognized the unpredictability of the future as an important factor permanently tied to the apron strings of industry. Constructive thinking, in the past, with particular attention to this factor, has resulted in the production of modern storage systems purposely designed for immediate conversion or expansion without imposing penalties to meet any need.

There is no limit to the equipment that can be incorporated into a Marietta silo wall, roof or floor. A flexible Marietta Silo will accommodate any discharge system.

Concrete silos erected during 1916, the year Marietta ventured into the industrial storage system business, are in useful operation today, standing as undeniable tributes to the wisdom, integrity and engineering prowess which have always been fundamental characteristics of The Marietta Concrete Corporation.

Whatever you store or handle, you'll be money ahead with a complete Marietta Concrete Storage System. Write today for particulars. Catalog upon request.

THE Marietta CONCRETE CORPORATION

MARIETTA, OHIO

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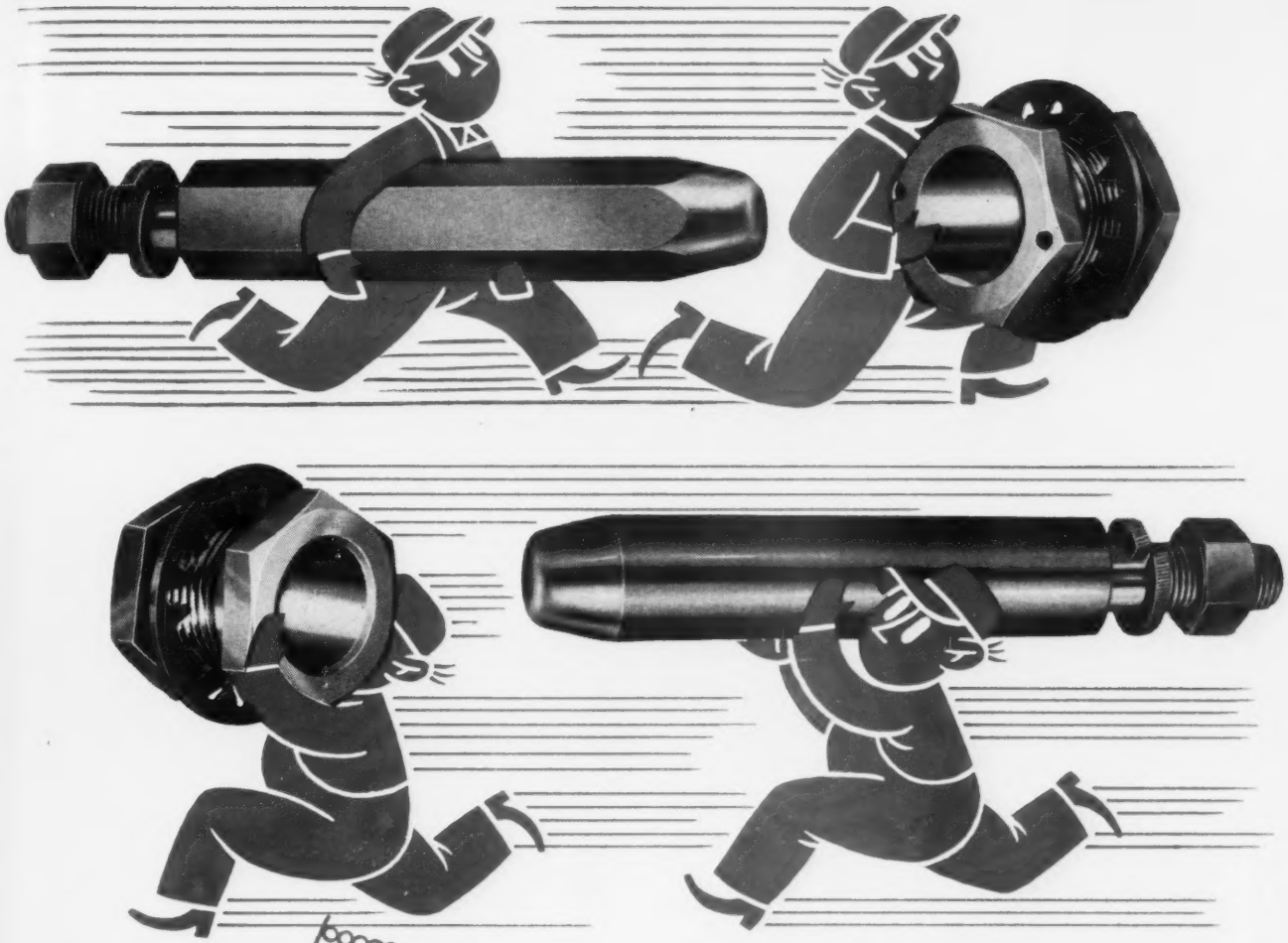
PRECAST CONCRETE PRODUCTS FOR FARM, HOME AND INDUSTRY

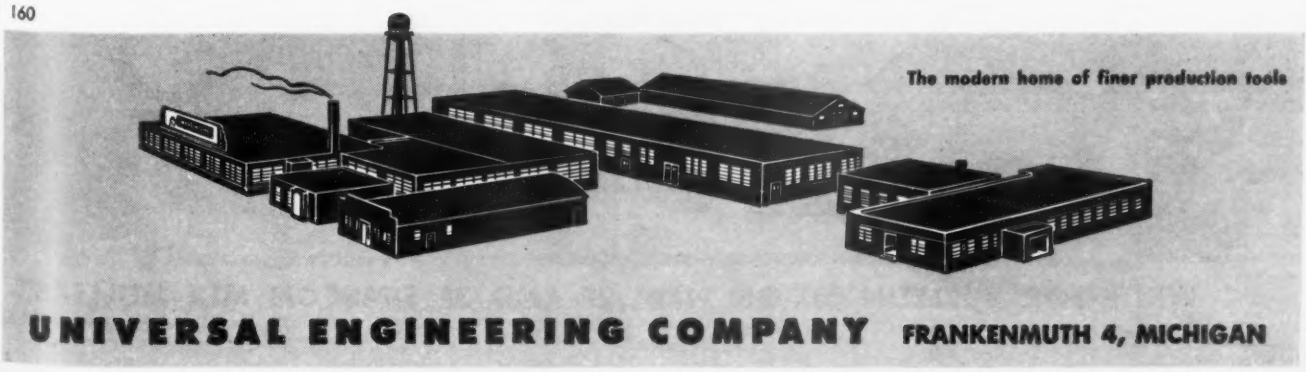


YOU SAVE TIME WITH UNIVERSAL

THREADED FLASK PINS AND BUSHINGS

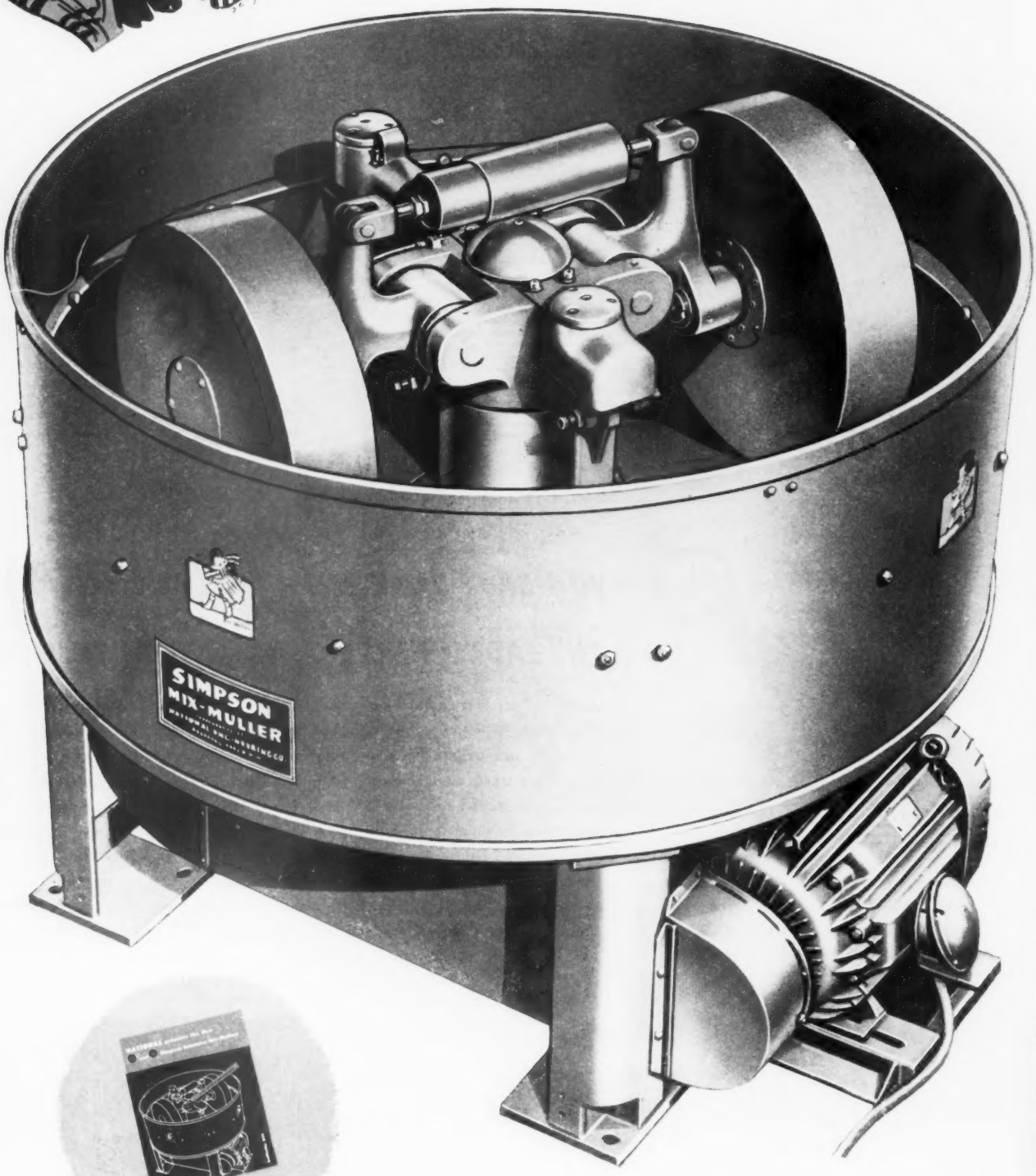
Universal Flask Pins and Bushings save precious minutes of production time because they assure instant, accurate alignment of cope and drag. And they also save down-time because, being heat-treated and precision ground from fine quality steels, they stand up under rough treatment and give long, satisfactory service. Universal threaded series Flask Pins and Bushings are used in steel, aluminum, magnesium or other light metal flasks. Bushings are available in both the round and elongated types; pins in both round and hexagonal types. Universal carries a complete line of sizes of its threaded series as well as its taper and plain series Pins and Bushings as regular stock items. For further information write to the Universal Warehouse nearest you — 1060 Broad St., Newark, N. J., 5035 Sixth Ave., Kenosha, Wisc., or the home office.

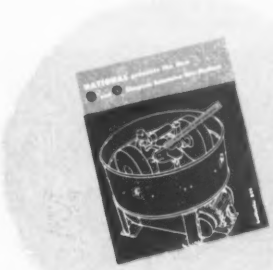
160



UNIVERSAL ENGINEERING COMPANY FRANKENMUTH 4, MICHIGAN

What do you





WRITE FOR BULLETIN 511 ON NEW 2F AND 3F SIMPSON MIX-MULLERS

u want in a muller?

Because properly prepared foundry sand, like good castings, is produced from a *combination* of machines, materials and manpower — selection of the proper *muller* for any job is usually complicated by a host of variables. Simpson Mix-Mullers are sold on the basis of providing the user with three *basic* performance factors.

Capacity — MIX-MULLERS deliver it

Built in 10 models, in true batch capacities of from 25 to 4000 pounds, there is a Mix-Muller for every production need. Range of capacity permits consideration for future increased needs. Because of large batch capacities one Simpson, properly selected, may replace *two* ordinary sand mixers.

Uniformity — MIX-MULLERS assure it

In a Simpson, each grain of sand is subjected to an *intensive* kneading, smearing action. The simple rugged design assures *thorough* mixing . . . ease of operation, continuous control over quality, less scrap and a reduction in bonds and raw materials.

Economy — MIX-MULLERS are misers

Muller wheels guaranteed for 5 years, centralized lubrication, anti-friction bearings throughout, V-Belt drive, improved access to drive and operating mechanism . . . all are features of the time tested and proven 2F and 3F Models—features that mean longer life—lower maintenance; more profit per pound of metal poured.

So, if you are looking for the *right combination* of features in a muller, look first for *performance* based on CAPACITY, UNIFORMITY and ECONOMY of operation. A National Engineer can show you why leading foundries have chosen Simpson Mix-Mullers on this basis for over 35 years.

National Engineering Company
(Not Inc.)
608 Machinery Hall Bldg. • Chicago 6, Illinois

Products of the Practical Foundryman

SIMPSON
Intensive
MIX-MULLERS

32-YEAR-OLD QUINTUPLETS GREW UP AT 2500°

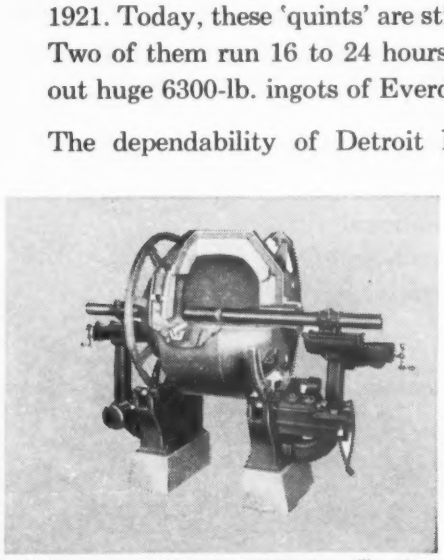
5 DETROIT ROCKING ELECTRIC FURNACES FOR EVERDUR INGOT PRODUCTION AT DETROIT PLANT OF AMERICAN BRASS

Melting tough Everdur alloy calls for a furnace that can produce uniform results at high, controlled temperatures. To meet these requirements, the American Brass Company installed five Detroit Electric Furnaces in their Detroit Plant back in 1921. Today, these 'quints' are still in the foundry. Two of them run 16 to 24 hours per day turning out huge 6300-lb. ingots of Everdur.

The dependability of Detroit Rocking Electric Furnaces—at American Brass and in plants throughout the world—is measured in both furnace performance and melt results. They give years of economical, trouble-free service and deliver metal of consistent quality through heat after heat. Sound design plus many exclusive engineering features account for this dual dependability.

Detroit's indirect arc heat provides fast, controlled melting of ferrous or non-ferrous metals while holding alloy variation and carbon pick-up to a minimum.

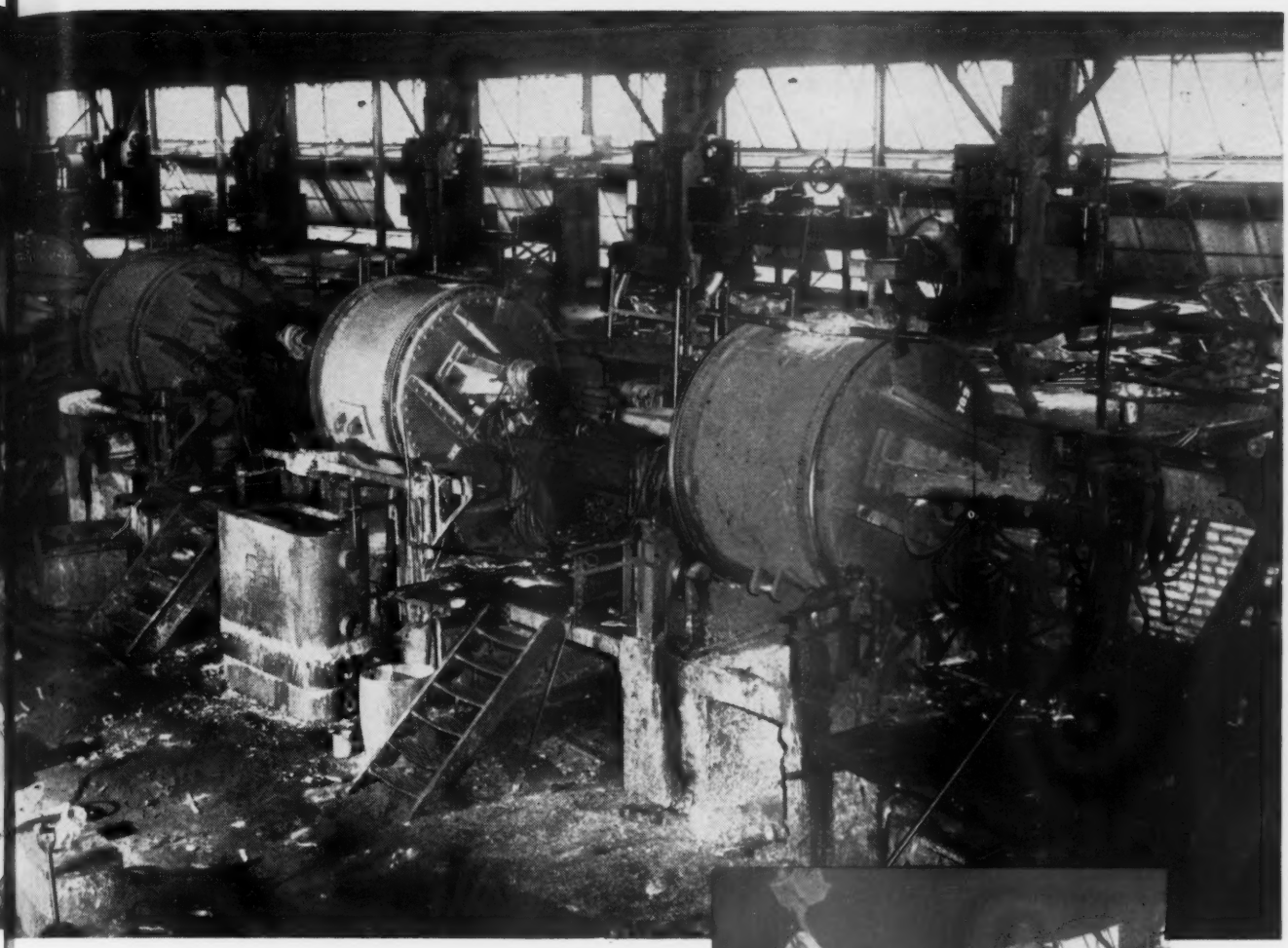
Controlled rocking action of Detroit Electric Furnaces has many advantages. The molten metal is



Cutaway view of the Detroit Rocking Electric Furnace, showing engineering and construction features. Rocking action assures maximum heat utilization.

DETROIT ELECTRIC

Kuhlman Electric Company



Pouring a 6300-lb. ingot of Everdur at American Brass. Ladle and furnace pour simultaneously to assure uniform hardening.

washed over a large area of the refractory for greater utilization of heat and longer refractory life. And constant motion assures homogeneity of the metal. With automatic rocking control, the most favorable melting cycle can be duplicated, assuring uniform melts at optimum power consumption.

Economy features include less metal shrinkage; more usable metal per heat; less down time because of longer refractory life, easy shell replacement.

Write today for full information on Detroit Electric Furnaces and how they can do a better job for you.

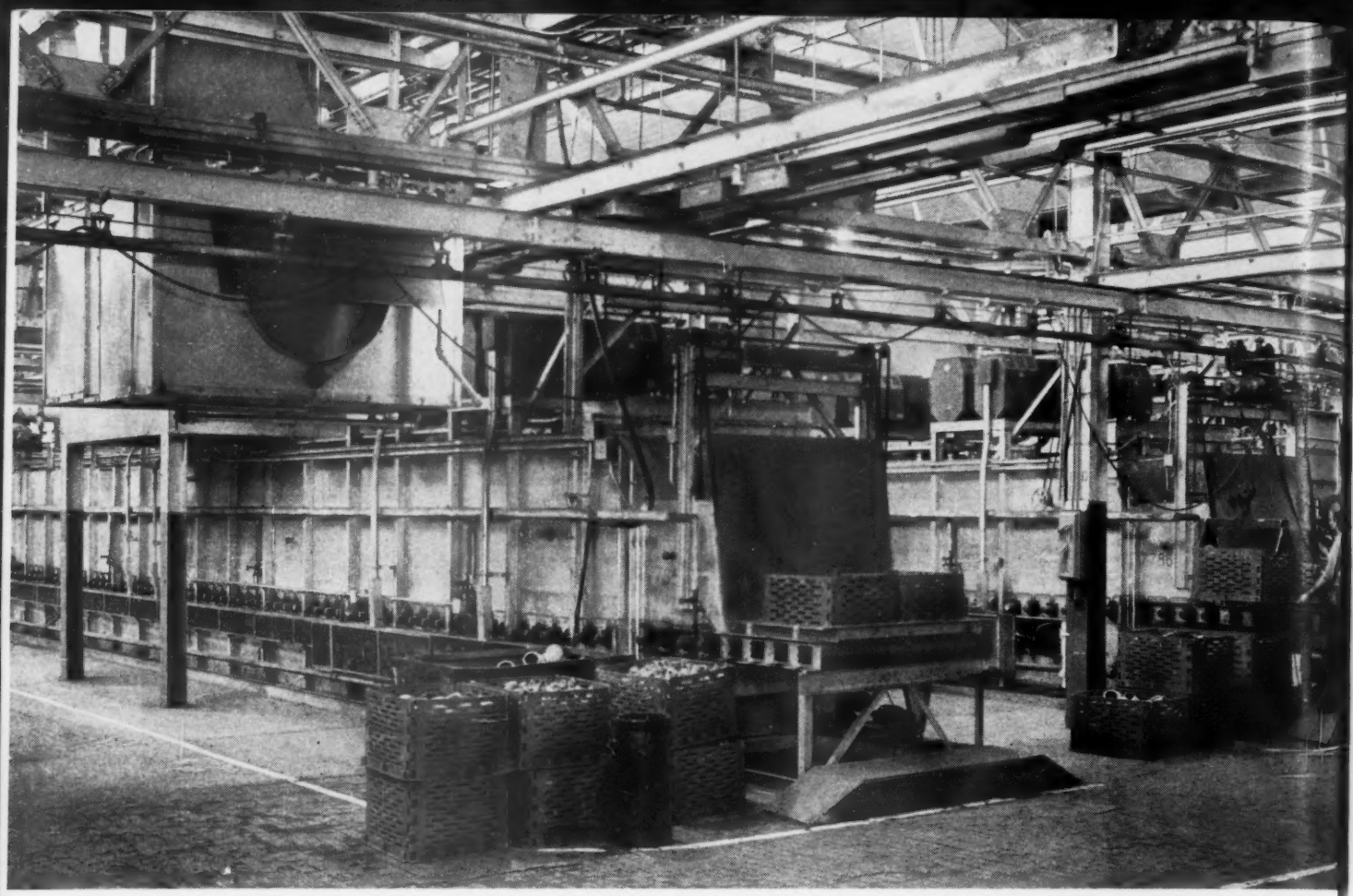
Furnace capacities from 10 to 4000 pounds.

FURNACE DIVISION

Bay City, Michigan

MEMBER FEMA FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC.

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Eisa" Ltd., Sao Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N. Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D. F., Mexico; EUROPE, ENGLAND: Birlec, Ltd., Birmingham.



MODERN MALLEABLE-IRON ANNEALING at its best is achieved in these G-E roller-hearth furnaces. Automatically controlled, both are easily operated by two men. Over 32 tons of low-cost, high-quality castings are processed in these furnaces every day.

Crane Co. Reduces Annealing Cycle 50%, Cuts Man-hours 40% with G-E Furnaces

Replaces Oil-fired Furnaces To Speed Production, Cut Costs

"We've shortened annealing cycles from 4 days to 48 hours, cut man-hours 40%, and sharply reduced maintenance costs by changing to G-E continuous furnaces for annealing malleable iron," says Harry Maack, Chief Metallurgist, Crane Co., Chicago.

With their old oil-burning furnaces, Crane had long annealing cycles and comparatively low production rates. Now, with their new system—including two G-E roller-hearth furnaces and control equipment—they process over 32 tons of castings every 24 hours.

G-E furnaces don't require expensive annealing pots as do fuel-fired furnaces because electric heat preserves the protective atmosphere given off by the castings. Simple, low-cost baskets are all that is needed. This reduces handling time and gives fast, uniform heating of castings. Straight-line, continuous annealing means that no time is wasted in waiting for the furnace to heat up or cool off as was necessary under the old system.

Crane's clean annealing setup has eliminated the discomfort of fumes, dust, and radiant heat. Low maintenance is assured because with durable G-E equipment, there are no products of combustion to cause furnace corrosion.

These extensive savings show how modern electric heat has revolutionized the malleable-iron industry. The first step in applying these benefits to your operation is to contact your nearest G-E Apparatus Sales representative.

GENERAL ELECTRIC

WRITE NOW FOR THESE MODERN METAL PROCESSING BULLETINS

Annealing Malleable Iron, GEA-5797 **Furnace and Induction Brazing, GEA-5889** **Heat Treating of Aluminum, GEA-5912**

Address: General Electric Co., Sect. 720-120, Schenectady 5, N. Y.

NOW... THE NEW TYLER SHELL MOLDING MACHINES

COMPLETE WITH GAS HEATED OVENS AND PATTERN PLATES

Gas Heating Units for Match Plates Standard Equipment on All Machines

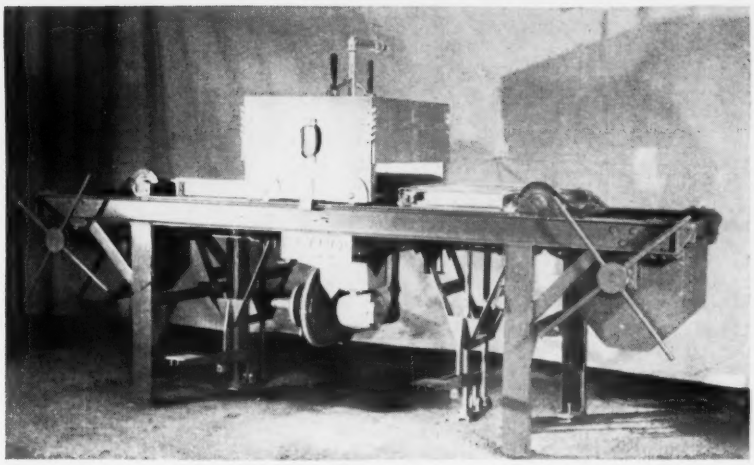


Photo above is especially built size 15"x19"
All other size machines prices quoted upon request.

Standard Sizes Complete

13" x 12" . . $1595

13" x 24" . . $2095

F.O.B. St. Louis

Equipped for All Types of Gas

You can now heat your pattern plates with gas. The gas heating unit stays with the pattern plate at all times during the operation and holds plate at even temperature. Through the use of gas heating pattern plates, it is not necessary to strip heat or wire each plate, remove plate and insert next plate and continue with production. Eliminates wiring and maintenance.

See these machines in actual operation at the following distributors: M. A. Bell Company, 217 Lombard Street, St. Louis 2, Mo. • M. A. Bell Company, 3201 Sherman Street, Houston, Texas • Kencroft Associates, Inc. 373 Hertel Avenue, Buffalo 7, New York • Wasatch Ball Foundry Inc. 531 West 7th South Street, Salt Lake City, Utah.

TYLER METAL Products Company

METAL STAMPINGS — DESIGNERS & BUILDERS
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11TH & TYLER STREETS
ST. LOUIS 6, MO.

TYLER METAL PRODUCTS CO.—
10th & Mullanphy, St. Louis, Mo.

I AM INTERESTED

☐ In seeing machine in operation

Date . . . . . Time

☐ Would like someone to call on our company with more information

Date . . . . . Time

Company Name . . . . . .

Address . . . . . .

Signed . . . . . Title . . . . . .

THEY'RE PROVEN . . . . . ENGINEERED!

For positive carbon control use MEXITE® Briquettes in every cupola charge

Each briquette is the carbon equivalent of 50 lbs. of pig iron

- MEXITE prevents troublesome carbon variations throughout the heat by supplying a dependable source of soluble carbon . . . Use MEXITE for metallurgical carbon, use your coke for fuel.
- MEXITE is flexible . . . it can be used for carbon raising throughout the heat or at any time during the heat.
- MEXITE maintains the desired carbon analysis even when charging 100% scrap.
- MEXITE improves castings by reducing shrinkage defects due to low carbon.
- MEXITE means better fluidity, lower chill and hardness and easier machinability by insuring maintenance of the carbon analysis.

Let our experienced foundry engineers give you all the facts about MEXITE . . . write us for detailed engineering bulletin.

THE UNITED STATES GRAPHITE COMPANY

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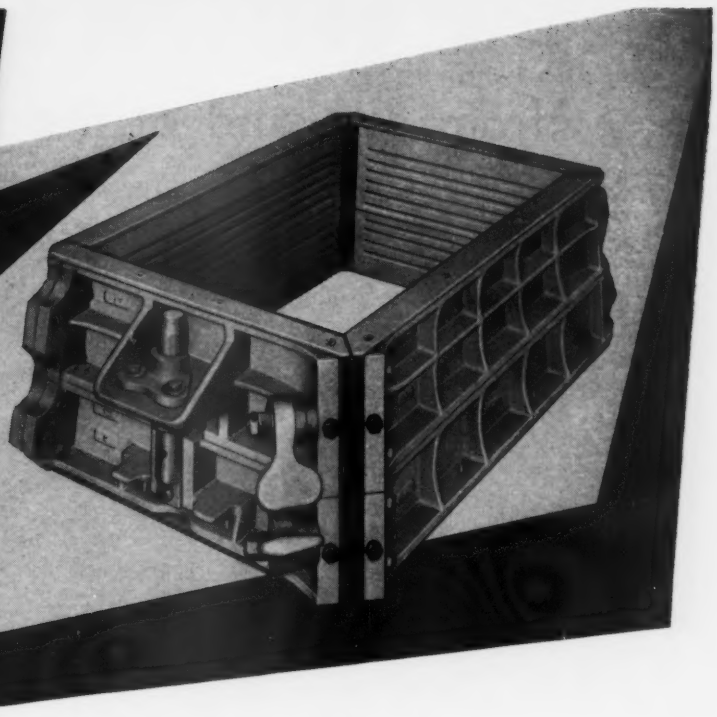
TWICE AS STRONG
A Third Lighter



—that's why magnesium is so popular for flask construction...

Magnesium has twice the tensile strength of aluminum, thus assuring longer service, and magnesium weighs 1/3 less than aluminum, making for easier handling.

FREMONT MAGNESIUM FLASKS

with their accurately machined inside surfaces and flanges and steel-faced top and bottom flanges, assure more exacting work.

THE NEW FREMONT SPREADLOCK FLASKS

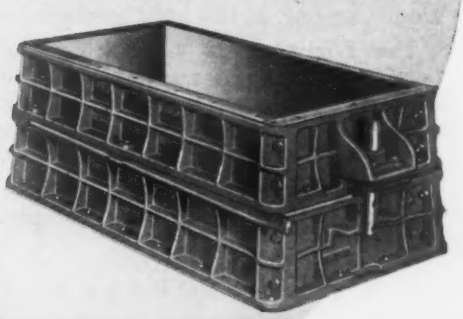
have long-life, easily replaceable, live-rubber corner inserts which completely close the corner gaps so that no sand can lodge in the open corners.

PERFECT ALIGNMENT INDEFINITELY!

is guaranteed by the one-inch GROOVLOCK FOOLPROOF PIN on

FREMONT STANDARD SLIP FLASKS

Particularly adapted to cope or drag pattern jobs. Solid, bolted and welded corner construction. Other types of standard pin fittings also available.



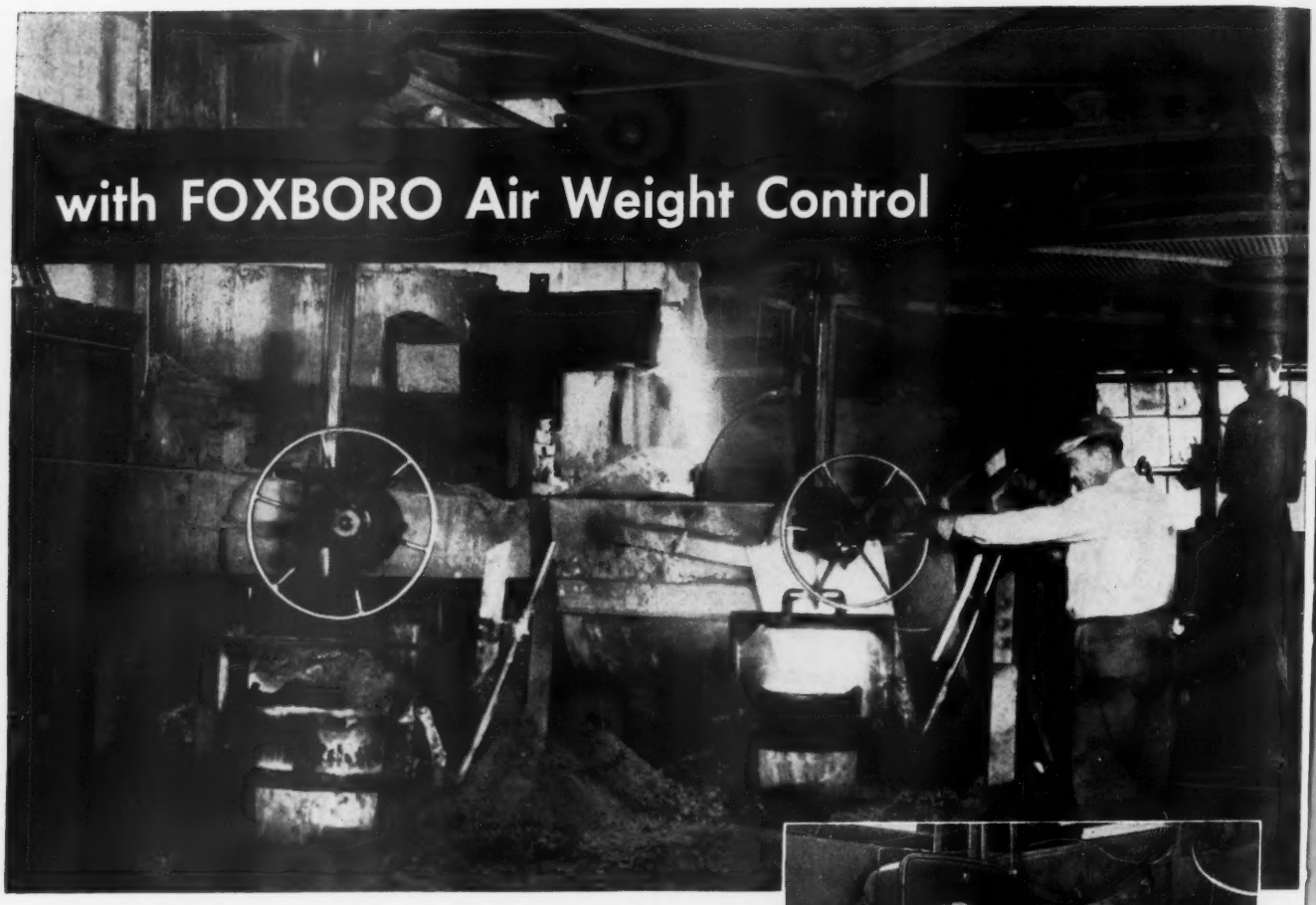
THE FREMONT FLASK COMPANY

FREMONT, OHIO

Write today for free literature and prices. All orders given prompt attention.

UNIFORM CASTINGS

"from one end of the heat to the other"



EVERY DAY, this New England foundry pours gray iron with a uniformity that insures better machineability of finished castings . . . and operating economies which protect the firm's competitive position. Says an official of this high-production jobbing foundry, "Foxboro Air Weight Control helps us hold our pouring temperature closer than manual control could ever do, and gives us dependable uniformity of castings from one end of the heat to the other".

The Foxboro Air Weight Controller automatically "weighs" air . . . supplies coke charge with exact amount of oxygen for best combustion . . . compensates for atmospheric changes. Faster, uniform melting saves fuel, cuts pigging, adds life to refractories.

Installation is simple . . . on either fan or positive pressure systems. Write for complete details.

Foundry Foreman checks readings on the Foxboro Air Weight Controller (left) and the Wind Box Pressure Recorder (right).

THE FOXBORO COMPANY, 321 NEPONSET AVE., FOXBORO, MASS., U.S.A.

FOXBORO REG. U. S. PAT. OFF. AIR WEIGHT CONTROLLERS

FACTORIES IN THE UNITED STATES, CANADA AND ENGLAND

Power-Packed for Profit...

SHOT OR GRIT . . . that's Malleabrasive. Malleabrasive is scientifically heat-treated and laboratory controlled to clean *better, faster,* and last *longer.* Malleabrasive cleans *cheaper* because you save on parts repair and down-time . . . because its long life cuts abrasive purchases. Don't take our word for it. Prove it to yourself. Next time you buy blast cleaning abrasive, specify Malleabrasive from Pangborn Corporation, 1400 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for the right abrasive for every blast cleaning job.

Pangborn — DISTRIBUTORS FOR — **MALLEABRASIVE®**

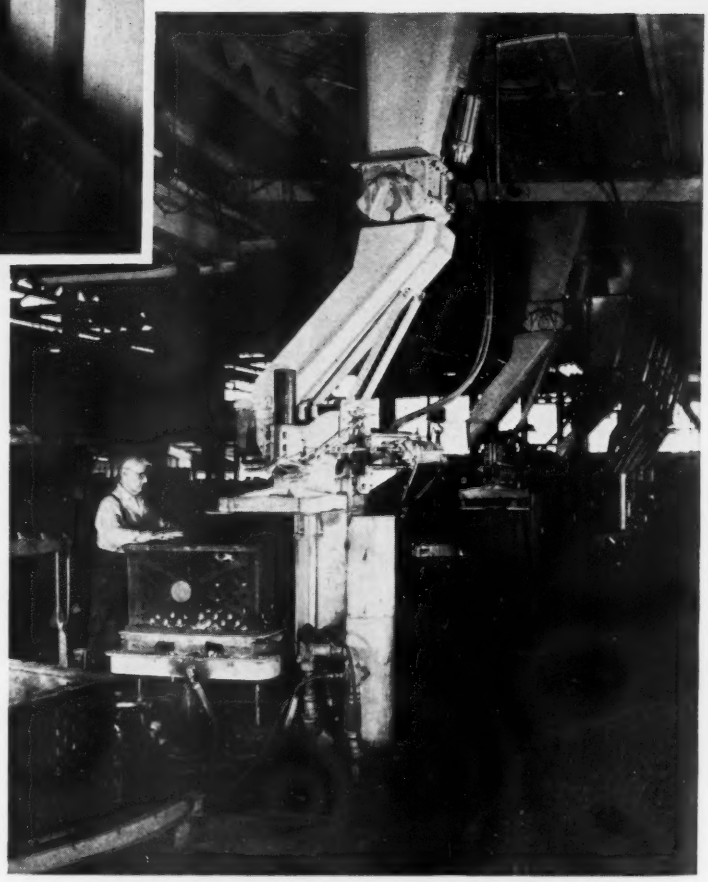
U. S. Patent #2184926
(other patents pending)

Pangborn BLAST CLEANS CHEAPER
with the right equipment for every job

it's New . . . it's Electronic . . . it Cuts Costs

JEFFREY AUTOMATIC PLOW

Here's another step toward greater mechanization of foundry production. Jeffrey's new automatic plow cuts costs by saving man-hours and preventing down-time. It is electronically controlled to assure continuous supply. Its probing action provides utmost efficiency in mechanized production.



Top view shows prepared sand delivery belt and Jeffrey Automatic Plow over hopper.

At right: **Molder feeds sand to flask through Jeffrey Clamshell Valve from hopper kept full by new Jeffrey Automatic Plow.**

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED

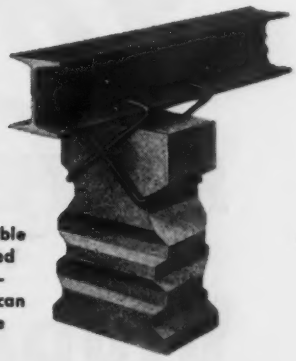
. . . IT'S A JOB FOR JEFFREY!

How to get the most out of

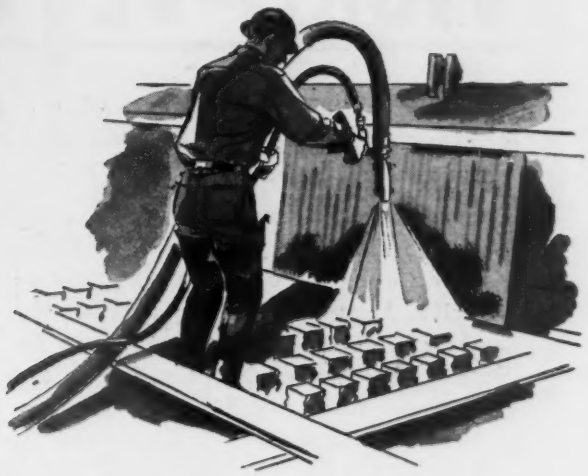
Suspended Refractory

CONCRETE CONSTRUCTION

An example of B & W's Modern Suspended Castable Construction



Cross section of castable form showing patented anchor tile and "ice-tong" hanger, which can be attached any place on I-beam.



B&W Kaocast may be gunnited, as shown above, or poured into a form.

Cross section of finished B&W Kaocast soaking pit cover, showing anchor tile and "ice-tong" hangers.

The big reason behind today's growing use of suspended castable construction is lower installation cost. The replacement of standard brick and special shapes by refractory castables (just as easy to use as structural concrete) is becoming so widespread that every furnace operator should consider it as a possible means of cutting his own installation costs.

Not only can refractory castables be handled easily, but such troublesome jobs as notching I-beams have been eliminated with B&W's patented anchor tile and "ice-tong" hanger. Maintenance patching is quicker, too, because this hanger can be slipped on or off anywhere on the beam.

But the major reason for the general preference of B&W's suspended castable construction is B&W Kaocast—the only refractory concrete for service up to 3000 degrees. Even at lower temperatures, B&W Kaocast results in longer, more economical service because it has a high resistance to spalling and practically no reheat shrinkage.

The step-by-step story shown at the right is an example of how B&W's modern suspended castable construction is used in soaking pit covers. These covers take plenty of abuse because of the rough handling they get, but B&W Kaocast stays on the job.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
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B&W REFRACTORIES PRODUCTS — B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment . . . Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

HANDLE *tough* MATERIALS... *with the* VIBRO-VEYOR

For STRENGTH
For EFFICIENCY
For ECONOMY
For SAFETY

Move those hard-to-handle Bulk Materials like foundry sand, ore, dry aggregate, coal, metal chips and turnings, or chemicals, with the JSCO VIBRO-VEYOR.

The rugged force of straight line reciprocating motion built into the entire length of each VIBRO-VEYOR gives an even flow and level plane of materials. Materials handling costs are cut, capacity and efficiency of conveyance increased and power consumption is kept at a minimum with the VIBRO-VEYOR.

This JSCO VIBRO-VEYOR

was built to handle molding sand in a floor clean-up system of a steel foundry. It is driven by a #12 CPH Shaker with 2 H.P. Motor.

Other VIBRO-VEYOR Features:

Low head room; choice of motor location
Intermediate discharge gates and/or intake spouts
No spillage — no openings or loose joints.
Self cleaning— no pockets to obstruct flow.
Safe for men to work around (after protecting drive belts).
Ideal when dust, abrasion, corrosion or contamination problems exist.

Write for additional information

JOHNSTONE DIVISION OF
KAYSING IRON WORKS
2500 MONTGOMERY STREET • ST. LOUIS 6, MO.

JSCO

THEY TRIED A SMALL *Thermex* UNIT

...proved the value of Thermex Electronic Baking

...THEN BOUGHT TWO BIG *Thermex* UNITS

Modernization cuts core room manhours 33%

"THE PROOF OF THE PUDDING" is in the heating at James B. Clow & Sons, Coshocton, Ohio. To prove the superior speed and quality of electronic core baking for pipe fittings, this progressive foundry installed a 15 KW Thermex unit three years ago. The results led them to modernize the core room and to make the mainstay of this streamlined operation two 60 KW Thermex Core Baking Units. This renovation has enabled Clow to reduce the core room crew from 24 to 16 . . . saving 8 men for other departments.

S. C. Clow, Chief Metallurgist, cites these advantages of core baking with the Thermex equipment:

1 Improves dimensional stability. Minimizes the sagging of cores.

2 Saves manhours. Cuts handling of cores and plates. Eliminates rod reinforcing of cores.

3 Reduces core loss due to breakage in pouring and handling.

4 Speeds up turnover of core plates. Fewer plates needed and being of plywood, they are cheaper.

5 Can produce cores in special runs quickly. Highly flexible.

6 Baking is versatile. Used for cores as small as 2 ounces . . . as large as 400 pounds.

Find out how *you* can cut costs and improve cores with Thermex equipment. Write for free booklet. The Girdler Company, Thermex Division, Louisville 1, Ky.

*THERMEX—Trade Mark Reg. U. S. Pat. Off

the GIRDLER Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY

THERMEX DIVISION

Counterboring tool and wrenches are the only tools required for installing HINES pins and bushings.

HINES *flasks are equipped to your exact requirements with single or double pins . . . round, hex or "V" type . . . adjustable slides or bushings.*

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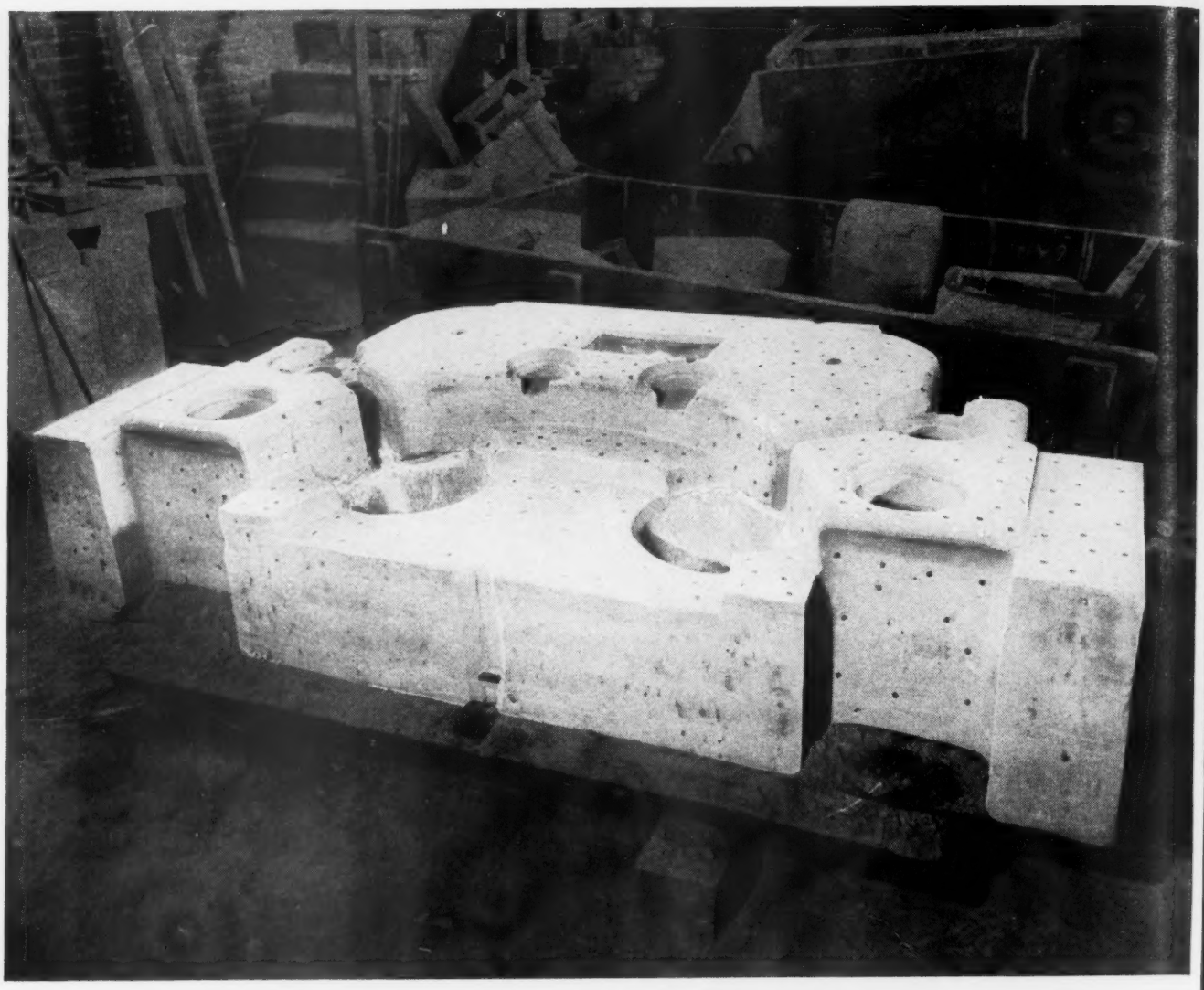
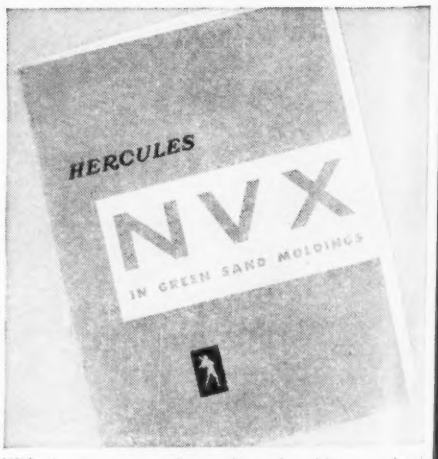


STEEL FOUNDRY CUTS CORE BAKING TIME 50% WITH TRULINE® BINDER IN THE MIX

This huge core, with its thick cross sections, would have required two nights or more for baking with core oil in the mix. By using Truline Binder instead, it was thoroughly baked overnight. Faster baking is just one advantage of Truline-bonded cores. They also mean less gas at pouring time . . . sounder steel castings. Cores collapse easily, helping to eliminate cracked castings. Send for technical data on Truline Binder. Our foundry service men will be happy to show how it can save you time and money.



NVX for improving the quality of molding sand and castings is another Hercules product serving steel foundries. Detailed information and technical data on NVX are contained in this 12-page book. Write Hercules for your copy.

NF54-3

Naval Stores Department

HERCULES POWDER COMPANY

INCORPORATED

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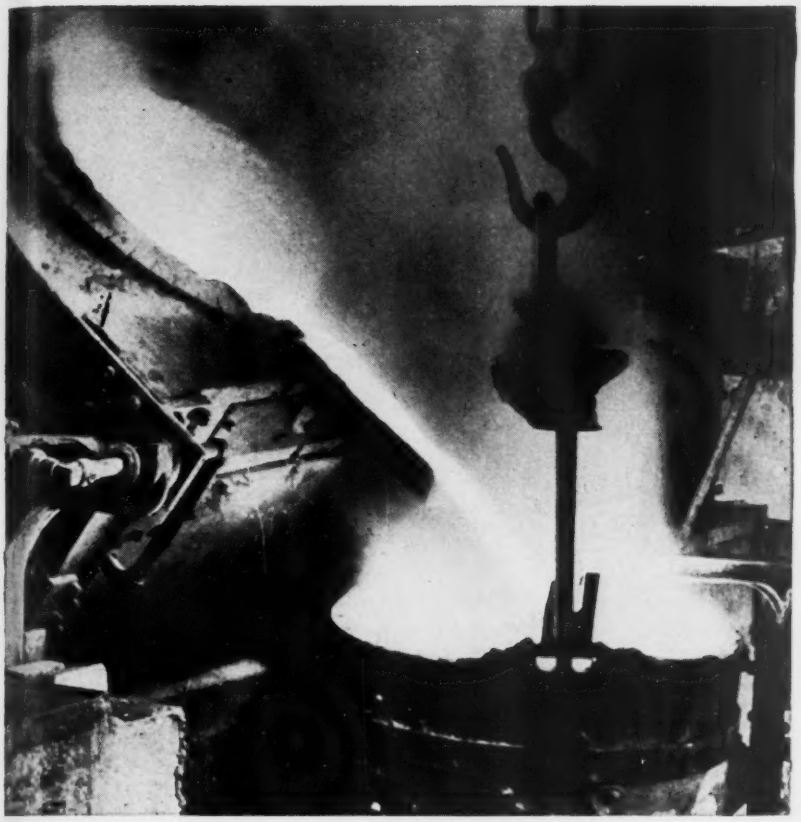

50 TONS of Stainless Steel a Day...

Melted in this AJAX-NORTHRUP INDUCTION FURNACE

Every 1¾ hours, one of these Ajax-Northrup furnaces pours 10,000 pounds of top-quality stainless steel. Total capacity is well over 50 tons a day!

Composition is uniformly exact. Alloying elements are controlled within a fraction of a per cent in every melt. Carbon is consistently kept below 0.05%.

Losses of expensive elements are negligible. Operating costs have been low enough to pay for the furnaces in just a few years!

This installation is typical of the growing use of induction melting for larger and larger jobs. In some of these, induction melting is the only way the job can be done. In others, it does the job better, faster, and at lower cost than any other melting method.

No matter what the job . . . or the quantity . . . Ajax-Northrup's 36 years of induction experience can help you. Just write or call us.

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AJAX NORTHRUP

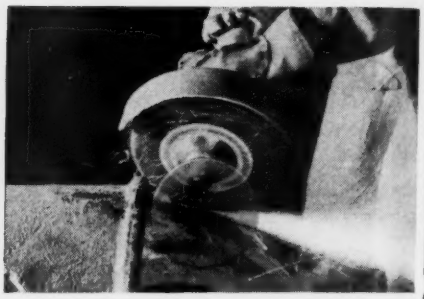
INDUCTION HEATING AND MELTING

Since 1916

148

On swing frame grinders Norton wheels stand up under heavy grinding pressures at high speeds, combining fast, clean cutting action with extra long wheel life. For high tensile strength metals use ALUNDUM* abrasive; for low tensile metals, CRYSTOLON* abrasive.

On floor stands you grind faster and at lower cost with Norton ALUNDUM or CRYSTOLON wheels. There's a right Norton abrasive-and-bond combination for every metal, every job.



On portable grinders the smaller Norton wheels do the same big job of cost cutting. With their inbuilt balance they *hug that work* — to grind more metal per man-hour.

On many jobs the versatile Norton Nylon-Reinforced Hub Wheels — BD rigid and BFR semi-flexible — are the fastest, easiest, *safest* wheels to use. They're ideal for weld grinding and similar finishing operations.

Bring out the hidden profits in your rough grinding with the

"TOUCH OF GOLD"

Rough grinding jobs *can* be as definite money-making operations as any other form of grinding.

And they *will* be when you add the "Touch of Gold" with Norton wheels that are exactly right for the work you're doing on the machines you're using.

Then you'll grind off more metal per dollar, increase production and cut costs every day, on countless routine jobs.

And you'll realize that the *hidden profits* in your rough grinding operations need only this time-and-money-saving "Touch of Gold" to bring them to light.

Your Norton Distributor

can bring long, practical experience to your rough grinding problems. If necessary, he'll call in your Norton Abrasive Engineer for expert advice on new or difficult applications. Backed by the world's largest manufacturers of abrasives, with the broadest line to choose from, these Norton men will make sure you get exactly the wheels you need.

Ask your Norton Distributor for Booklet No. 1405 . . . 54 illustrated pages covering every phase of rough grinding. Or write direct to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities — look under "Grinding Wheels" in the yellow pages of your telephone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

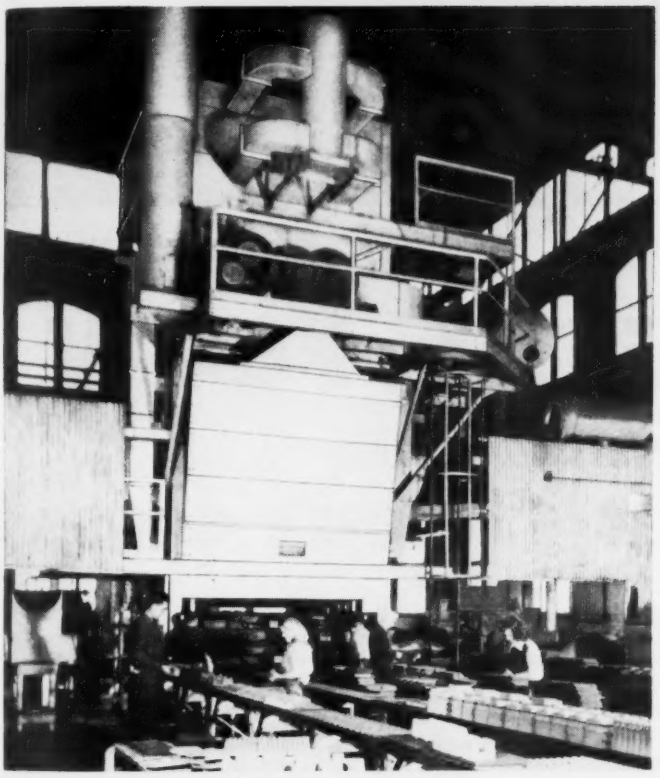
NORTON
ABRASIVES
Making better products... to make other products better

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

W-1499

Dependability of COLEMAN OVENS

proved by repeat orders



Coleman Tower Oven
at Eastern Malleable Iron Company

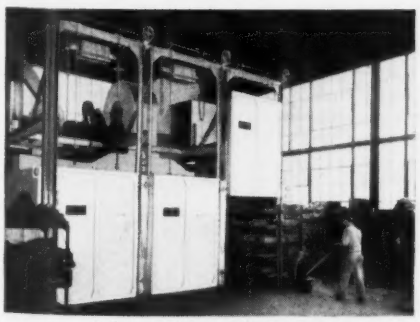
The proper selection of core and mold ovens is vital to profitable casting operation. That's why it's important that you get all the facts about Coleman Ovens and see the performance records that prove their ability to provide substantial savings.

Over 80% of Coleman Ovens are "repeat orders" from customers...conclusive evidence of continuous, dependable performance in foundries of all types. You get over 50 years of know-how and experience in every Coleman Oven, so why gamble with inferior types?

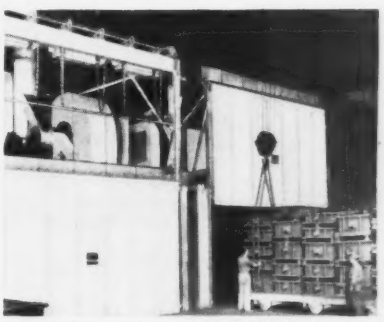
There is a Coleman Core or Mold Oven to meet your requirements whether you have large production runs or small and specialized jobs. Our experienced engineers are available without obligation.

WRITE FOR BULLETIN C

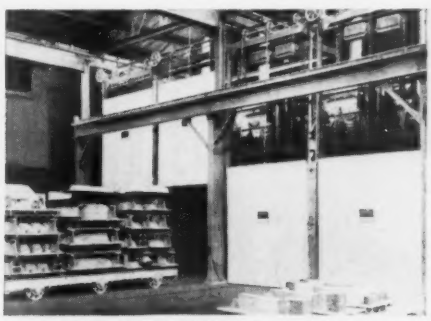
A COMPLETE RANGE OF TYPES AND SIZES
for every core baking and mold drying requirement:
Tower Ovens • Horizontal Conveyor Ovens
Car-Type Core Ovens • Car-Type Mold Ovens
Transrack Ovens • Rolling Drawer Ovens
Portable Core Ovens • Portable Mold Dryers



Coleman Transrack Ovens
at Crucible Steel Castings Co.



Coleman Car-Type Mold Ovens
at Clark Brothers Company

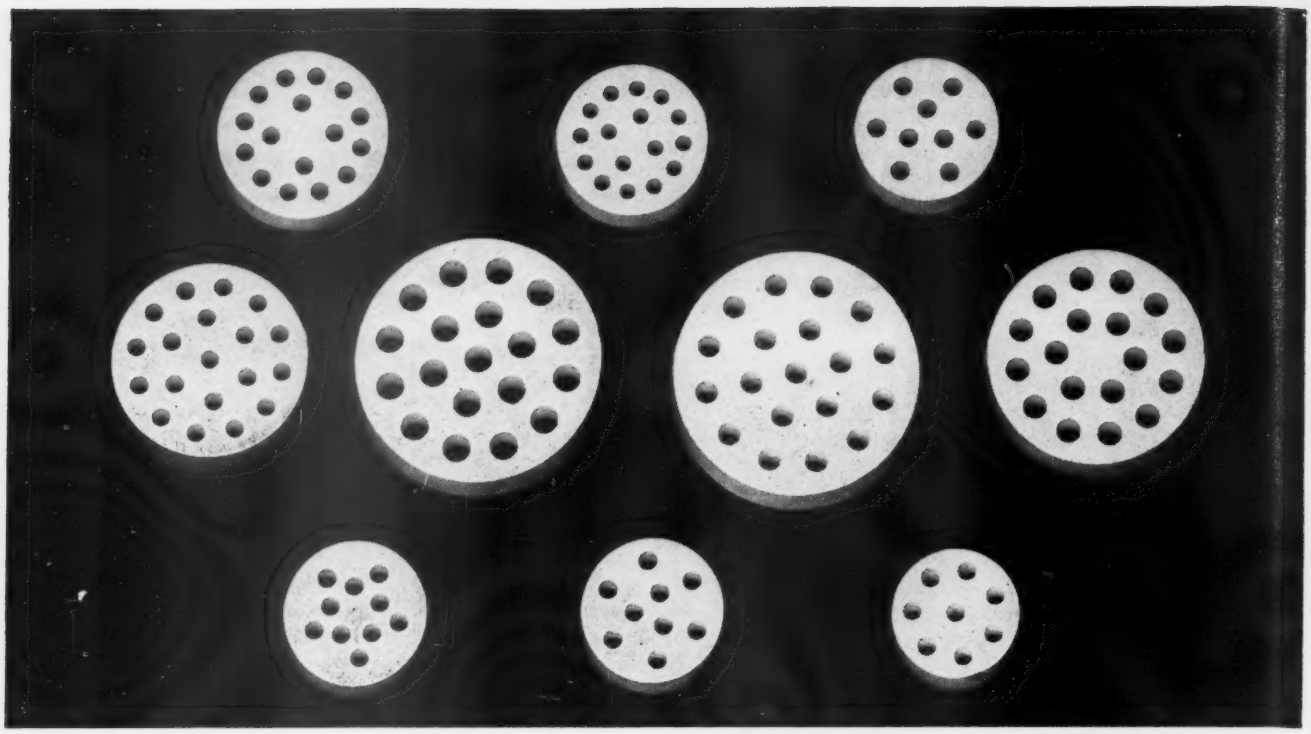


Coleman Car-Type Core Ovens
at Cooper-Bessemer Corporation

THE FOUNDRY EQUIPMENT COMPANY

1831 COLUMBUS ROAD • CLEVELAND 13, OHIO

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

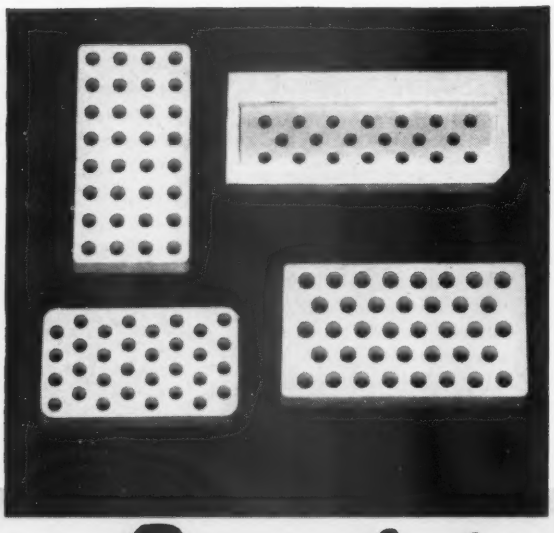


Regular stock sizes shown above—immediately available.

Positive METAL FLOW

...made possible with

PP INC. CERAMIC STRAINER CORES



Guesswork is eliminated and casting quality improved—where Porcelain Products Ceramic Strainer Cores are used. They provide a *positive* method of controlling pouring speeds. The holes in Porcelain Products extra high fusion point Ceramic Strainer Cores allow the molten metal to enter the mold at a pre-determined rate with no distortion or enlarging of pouring holes as experienced in oil bound cores through erosion and disintegration. Simply choose the strainer core that permits pouring at the rate you select, and control then becomes automatic.

There are more reasons, too, for using Porcelain Products Ceramic Strainer Cores. They turn out castings free from slag and sand inclusions—requiring less time in the cleaning room. They cut the number of rejects and reduce machining time. Porcelain Products Ceramic Strainer Cores withstand high heat, thermal shock, and can be stored indefinitely because changes in atmospheric conditions do not affect them. Available for immediate delivery in a wide variety of standard sizes. We also welcome inquiries on sizes designed to meet your special needs. Literature prints and samples available upon request.

Special sizes as shown at left produced to meet unusual specifications.

Porcelain Products, Inc.

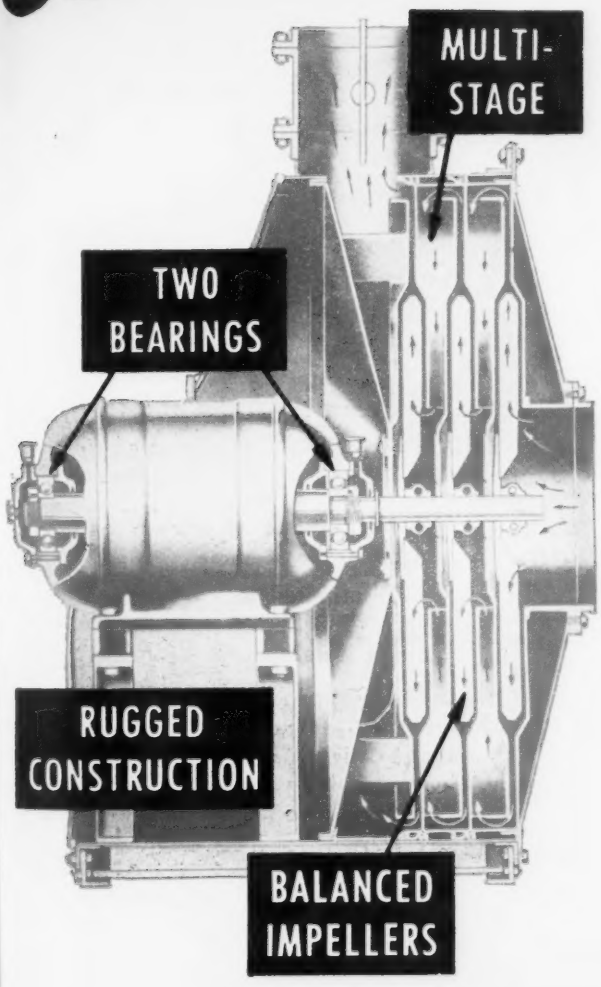
FINDLAY, OHIO

Distributed by: BUFFALO, Wark Foundry Equipment Co.; CHATTANOOGA, The Fischer Supply Co.; CHICAGO, Peterson Foundry Supply Co. CINCINNATI, The Buckeye Products Co.; CLEVELAND, The Nock Fire Brick Co.; DAYTON, The Fenton Foundry Supply Co.; DETROIT, Refracto Sales Co.; LOS ANGELES, Independent Foundry Supply Co.; MILWAUKEE. Interstate Supply & Equip. Co.; PHILADELPHIA, Pennsylvania Foundr Supply & Sand Co.; ST. LOUIS, Refractories & Furnace Supply Co.; TOLEDO, The Freeman Supply Co.

CONTINUOUS PRODUCTION

Assured 4 Ways

WITH SPENCER TURBO-COMPRESSORS



There are good reasons why the annual installation of Spencer Turbos has increased tenfold in ten years and why a recent analysis shows that repair parts amount to less than one dollar per machine per year.

No. 1. The Spencer multi-stage construction allows a smaller diameter machine with lower peripheral speeds of the fan blades and of the motor itself. The wear on the bearings is therefore cut to a minimum.

No. 2. The only rotating contacts are at the two ball bearings, which if kept greased will assure satisfactory operation without work stoppages for many years.

No. 3. Here is a machine as simple as an electric fan, with a rugged construction, as sturdy as a steel bridge and with wide clearances between the rotating elements and stationary parts. Users say "the Spencer goes on forever with little attention."

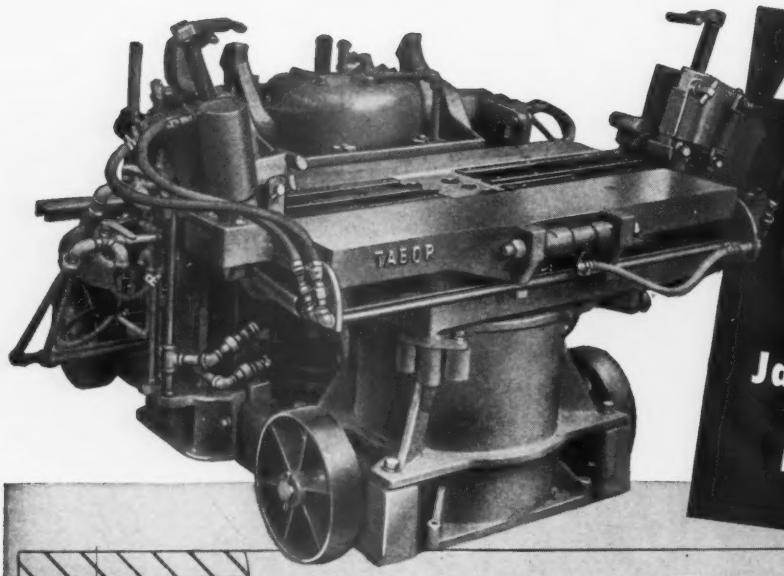
No. 4. Balanced Impellers. Each fan is individually balanced before the machine is assembled. This decreases the vibration, increases the life of the bearings and packing and produces quiet performance.

35 TO 20,000 C.F.M.; 4 OZ. TO 10 LBS.; 1/3 TO 1,000 H.P.

440-H

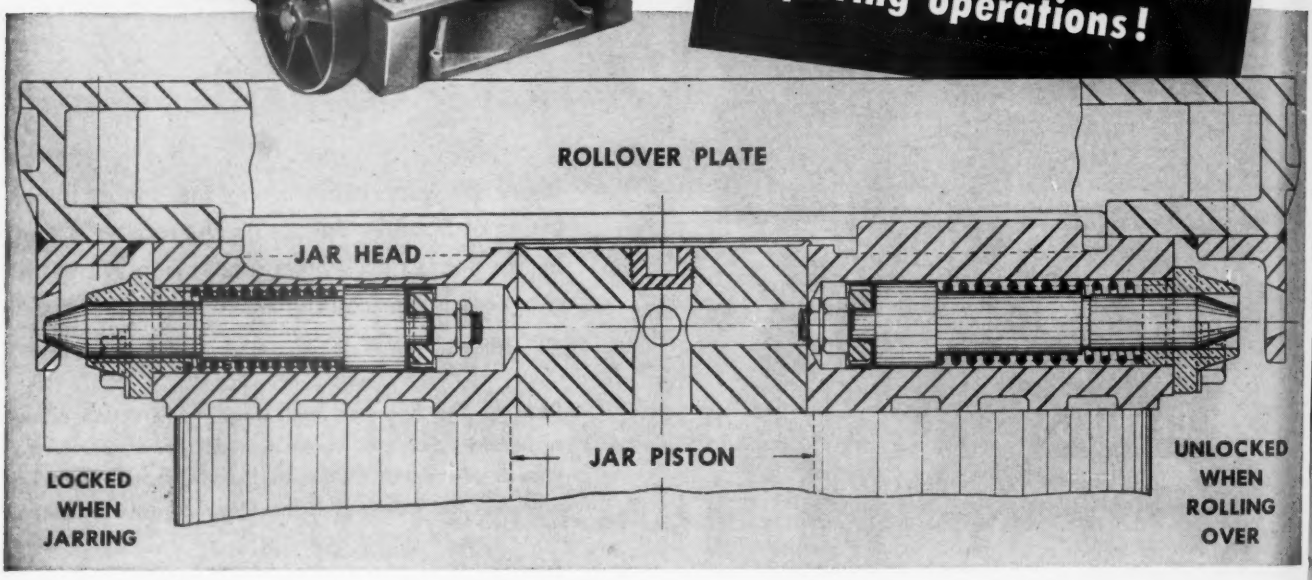
THE SPENCER TURBINE COMPANY • HARTFORD 6, CONNECTICUT

SPENCER
HARTFORD



ANOTHER TABOR FIRST...

Rollover Plate and Jar Head locked during jarring operations!



ROLLOVER PLATE—JAR HEAD LOCKING DESIGN

The above sectional drawing illustrates Tabor's new locking arrangement. Jarring air pressure automatically throws rugged pins into seats under the rollover plate. Pins retract under spring tension when jarring valve is closed.

HERE'S a feature never before offered in jar, power rollover, power draw machines. New Tabor construction locks rollover plate and jarring mechanism *into one rigid assembly* the moment jarring air is introduced.

This gives you *four* distinct advantages:

(1) Effectiveness of jarring blow is increased 25%.

(2) Ramming effect is equalized *all over the mold.*

(3) Does away with unwanted "secondary jolt" between plate and jar head—adds greatly to life of both members.

(4) Eliminates all plate wobble, even when handling a mold with uneven weight distribution.

Always big producers, Tabor Rollovers also feature the new quick-change-over table which permits *independent* setting of all four clamps—a table design which is invaluable in either core room or jobbing shop where pattern changes are frequent.

Get full details. Write, wire, or phone today.

REPRESENTATIVES
Snyder Foundry Supply Company, Los Angeles, Calif.; The Pacific Graphite Company, Inc., 40th & Linden Sts., Oakland 8, Calif.; Carl F. Miller & Company, Seattle, Washington; Harry H. Reich, Trussville, Ala.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

The TABOR *Manufacturing Co.*

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES
6225 TACONY STREET • PHILADELPHIA 35, PENNA.

EXPORT DEPARTMENT, 765 DREXEL BLDG., PHILA. 6, PA.

OREFRACTION

ZIRCON

SAND

AND

FLOUR

Orefraction Inc.

7433 THOMAS ST., PITTSBURGH 8, PA.

Distributed by

- M. A. BELL CO., St. Louis; Tulsa; Houston; Denver
  Fred McGee, Chattanooga
- FIREBRICK ENGINEERS CO., Milwaukee; Minneapolis; St. Paul
- FOREMOST FOUNDRY SUPPLY CO., Chicago
- FREDERIC B. STEVENS OF CANADA, LTD., Windsor, Ontario
- HOFFMAN FOUNDRY SUPPLY CO., Cleveland
- LA GRAND INDUSTRIAL SUPPLY CO., Portland, Oregon
- PENNSYLVANIA FOUNDRY SUPPLY & SAND CO., Philadelphia; New York; New England
- FREDERIC B. STEVENS, INC., Detroit; Buffalo
- EXPORT DEPARTMENT: 751 Drexel Building, Philadelphia, Pa.

A Day in the Life of a Clark Fork Truck

7:30 A.M. A barrel of cutting oil goes to the automatic screw machine department firmly supported between the forks of the Clark truck. Special handling equipment is eliminated.

8:40 A.M. A heavy, hard-to-hoist steel slab is fed directly into a heat-treat furnace. What used to be a dangerous, back-breaking job is now quick, safe and easy.

9:12 A.M. Rough castings of valve bodies are picked up from outside (overhead) storage for delivery to boring mills. The Clark electric truck is just as efficient on good surfaces outdoors as inside.

HOW EDWARD VALVES, Inc., SAVES M

9:05 A.M. Clark truck dumps tote box of forgings into heat treating basket. Filling a basket, each of which holds 1500 to 2000 lbs., takes less than three minutes.

10:00 A.M. The Maintenance Department calls for the Clark to replace a fluorescent tube in a high fixture. No more two-man teams to carry and hold a ladder; far less chance of an accident; big saving in time.

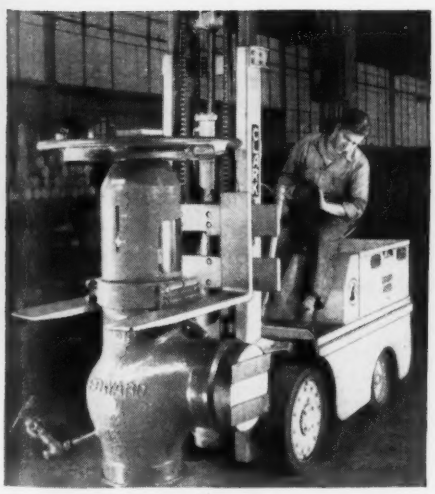
10:30 A.M. Cutting set-up time for positioning a new die in a forge-shop hammer —a Clark fork truck with only one man to guide the die. The Clark moves in easily where ordinary hoists are difficult to use.

11:20 A.M. Back to work for the maintenance department, the Clark truck moves a welding machine to a new location. At least one Clark truck is always ready for off-shift maintenance jobs.

3:20 P.M. Into a highway trailer truck goes a load of valves for shipment. Direct, one-operation truck loading means savings in the shipping department, quicker conversion of finished orders into billings.

1:10 P.M. In the finished parts stores department the Clark high-stacks a tote box of parts from the lathes. Edward conserves valuable production floor space by cubic-foot, instead of square-foot, storage.

MATERIALS HANDLING DOLLARS BY USING CLARK TRUCKS



2:35 P.M. A finished valve goes to the shipping department. Using Clark trucks eliminates many skidding operations, cuts crating costs for Edward Valves.

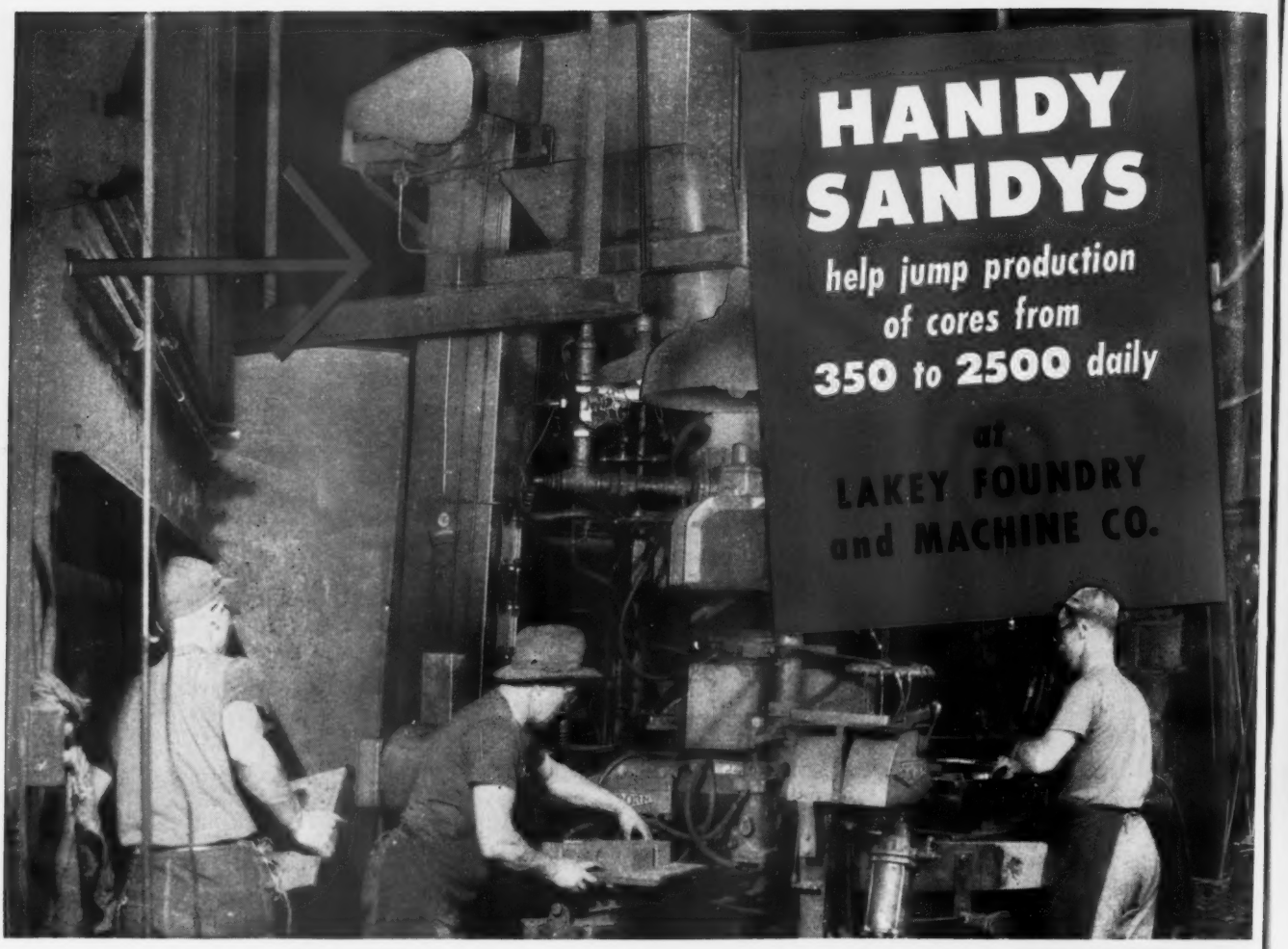
"We've declared war on materials handling costs," says W. F. Crawford, President of Edward Valves, Inc., East Chicago, Ind., Subsidiary of Rockwell Manufacturing Co. "Every day we're studying another handling operation to see if there isn't a quicker way to do it with less fatigue for the workman and lower costs."

"Clark trucks—both electric powered fork trucks and ***POWR-WORKER*** hand trucks—are a key weapon. We've used Clarks for 12 years, because they cost less to operate and do more jobs. Versatility is important in a plant our size; to really save money with lift trucks you've got to keep them busy doing many different operations."

Here are a few of the dozens of operations on which Edward Valves, Inc., has cut profit-eating indirect costs by using Clark Equipment.

INDUSTRIAL TRUCK DIVISION
CLARK EQUIPMENT COMPANY
BATTLE CREEK 16, MICHIGAN

CLARK EQUIPMENT



HANDLING CORE SAND

HANDY SANDYS

Handy Sandys are at work in Muskegon, Michigan. The Lakey Foundry and Machine Company, whose core room is shown above, had the problem of how to turn out cores in greater numbers, faster and at less cost. The cores had been made by hand ramming, with one man making up to 350 cores per 8-hour day.

A Newaygo Handy Sandy was installed in conjunction with a Rotary Core Blower, and with three men working on the unit, production was stepped up to well over 300 cores per hour, or at least 2,500 cores per 8-hour day.

A second Handy Sandy was then installed, to operate in conjunction with a large Core Blowing Machine and a Core Rollover, which when in full production blows cores at 100 cores per hour with one man as compared with the hand method of 45 per hour per man.

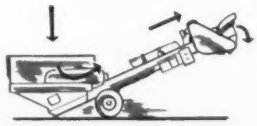
Regular Handy Sandys were installed, with special storage hoppers, wing boards and special feed hoppers, developed by Newaygo to meet the problem of lack of space in the core room. The storage hoppers are fed by overhead trams that periodically drop core sand into them, from which the sand is elevated overhead into the special feed hoppers and directly into the core blowing units.

Each Handy Sandy is capable of feeding over 8 tons of core sand per hour to each core blowing unit. The cores average from 14 to 50 lbs. each.

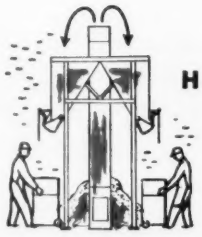
HANDY SANDY

puts sand overhead, eliminating shoveling for the molder.

REDDY SANDY



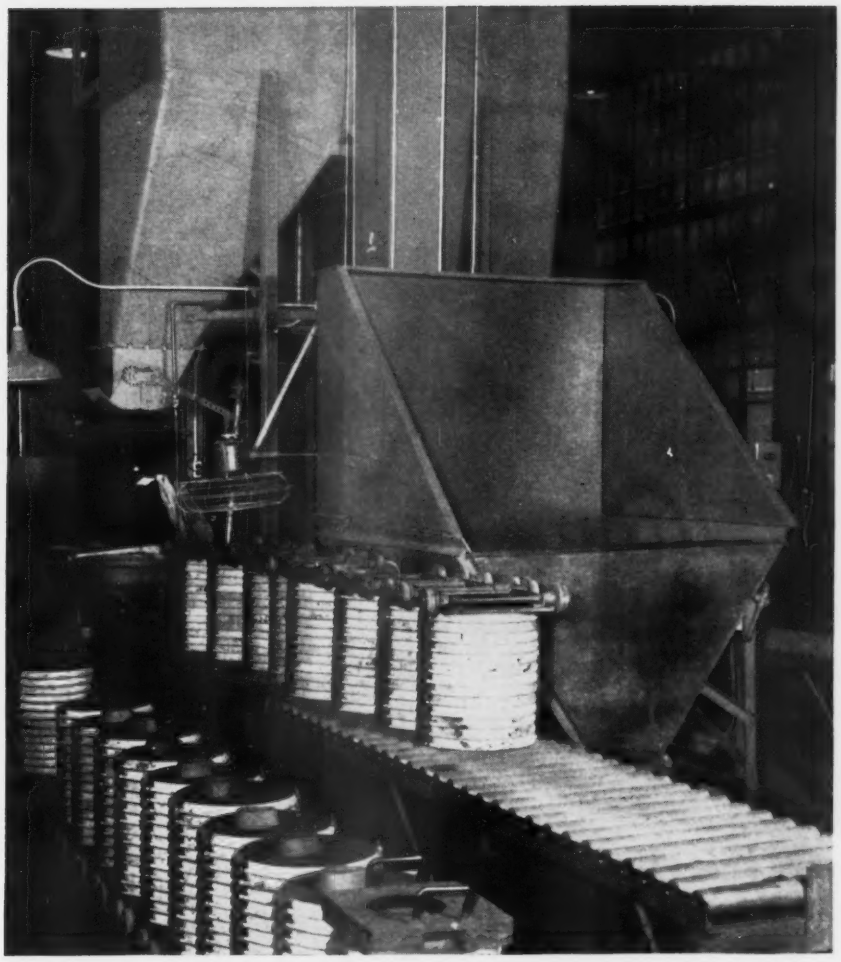
takes the hard work out of shakeout and sand preparation.



SUPER HANDY SANDY

a high capacity individual-floor sand handling unit.

no more shoveling for Stanley now that SEALED POWER has a HANDY SANDY



HANDLING MOLDING SAND

at work in Muskegon, Mich.

Handy Sandys are also at work in Muskegon, Michigan, at The Sealed Power Corporation. And now "there's no more shoveling for Stanley." Time spent shoveling by molders adds to the cost of the molds without adding to their quality.

By taking the shovels from the molders' hands and replacing them with Handy Sandys, Sealed Power Corporation has increased their mold production. Sealed Power uses two twin-hopper Handy Sandys in molding their larger piston rings and thrust plates.

Use of the Handy Sandys diminishes molder fatigue and improves working conditions. It improves the quality of the sand due to the extra aeration given the sand as it enters the overhead hoppers. And, Handy Sandy is a low-cost individual floor sand handling system, requiring no costly foundations. It gives you quick mechanization at a price you can afford to pay.

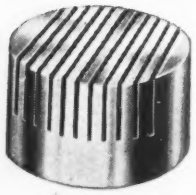
There are seven distinct advantages with an installation of a Handy Sandy, which mean lower costs in sand handling for you. Those advantages are: (1) Puts the sand pile overhead; (2) Eliminates shoveling and waste motions for the molder; (3) Increases molders' output; (4) Savings from the first unit installation pays for the next unit; (5) Improves condition of sand; (6) Takes little space; and (7) Low cost — simple to install.

You can mechanize one floor at a time, or your entire foundry, as you choose. Newaygo will help you plan your mechanization so the savings you make will help pay the cost.

A copy of "Planned Mechanization for Foundries" is yours for the asking. Write, wire, or phone today.

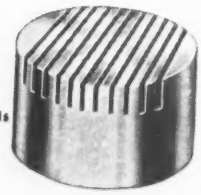
NEWAYGO engineering company
NEWAYGO, MICHIGAN
Manufacturers of Newaygo® Mold Handling, Sand Handling and Conditioning Equipment

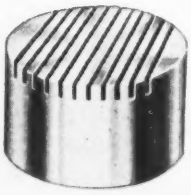
SMILLIE
CORE BOX VENTS
"A Specific Type for Every Core Box"
Slotted



X-TRA DEEP HEAD
.156
Wide Slots
.014

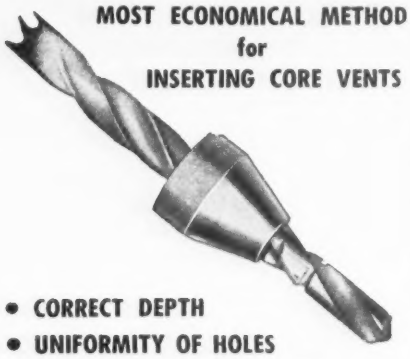
DEEP HEAD
.093
Wide or Narrow Slots
.014 .010





SHALLOW HEAD
.031
Wide or Narrow Slots
.014 .010

INSERTING DRILL
MOST ECONOMICAL METHOD for INSERTING CORE VENTS



- CORRECT DEPTH
- UNIFORMITY OF HOLES
- FASTER INSERTION OF VENT

VENT CLEANER
FOR CLEANING SLOTS
- MADE OF TEMPERED STEEL
- EASY TO USE

MANUFACTURERS OF PRECISION MACHINED-GROUND PARTS TOOLS-GAGES-FIXTURES

C.M. SMILLIE & CO.
1124 WOODWARD HGTS., FERNDALE 20, MICH

Readers' Comment

The Frustrated Killer

TO THE EDITOR:

I am the red-faced author of the advertisement "Picture of a Frustrated Killer," that you refer to in your "With the Editors" column in the November 1953 issue of FOUNDRY.

I want to assure you that neither I nor my client, X-Ray Inc., had the slightest intention or desire to cast any aspersions on the foundry industry or any part thereof.

Particular pains were taken to word this ad in such a way that we constantly referred to one specific part. Not at any time did we make any blanket claims or statements. If you will re-read the ad I think you will agree that this is the case.

However, in view of the fact that some members of the foundry industry have objected to this ad, we are making every effort to see that our future ads will in no way offend anyone.

Our most sincere apologies to you and the members of the foundry industry.

DONALD R. HODGINS
Stockwell & Marcuse Advertising
1407 *Industrial Bank Bldg.*
Detroit 26

* * *

Error in Equation

TO THE EDITORS:

Please send me tearsheets of the provocative article by Professor DeSy on "Graphite Spherulite Formation and Growth." This was published in the November issue on pages 100 through 103 and 210 to 220.

Is equation (2) on page 100 correct, or should the equality sign be replaced by a minus sign?

LESTER E. WILENSKY
Metallurgical Laboratories
Dow Chemical Co.
Midland, Mich.

Editor's Note: This was a typographical error in the equation; it should have been a minus sign.

* * *

Cost of Shell Molding

TO THE EDITOR:

Thanks very much for the privilege of having my article "Shell Molding. What Does It Cost?" published in your October issue. It has drawn much comment from your wide readership as attested by the fact that over 25 responses directly mentioning your publication, FOUNDRY, have been received.

Numerous other responses in the form of telephone calls and personal visits have also resulted. In our visits to various industrial centers and in meetings with foundrymen, we have been complimented on the article and its excellent layout and treatment, for which we have you to thank for your very fine handling.

WALTER W. COLEMAN
President
Southern Shell Mold Equipment Co.
2400 *Dayton Blvd.*
Chattanooga 5, *Tenn.*

* * *

Orchids to the Author

TO THE EDITOR:

"Carbon in National Defense" (November FOUNDRY) is a honey. Orchids to the author from me.

JAMES T. MACKENZIE
Technical Director
American Cast Iron Pipe Co.
Birmingham

* * *

Castings for Highway Use

TO THE EDITORS:

We have been requested by one of our customers to certify our castings are capable of sustaining H-20 highway loadings as defined by the American Association of State Highway Officials.

We would appreciate it if you can furnish us with information as to what H-20 highway loading is.

GEORGE B. SIMMS
President
Temple Foundry Inc.
Alexandria, Va.

Editor's Note: Suggest inquiring of the American Association of State Highway Officials, National Press Bldg., Washington 4.

* * *

A Veteran Retires

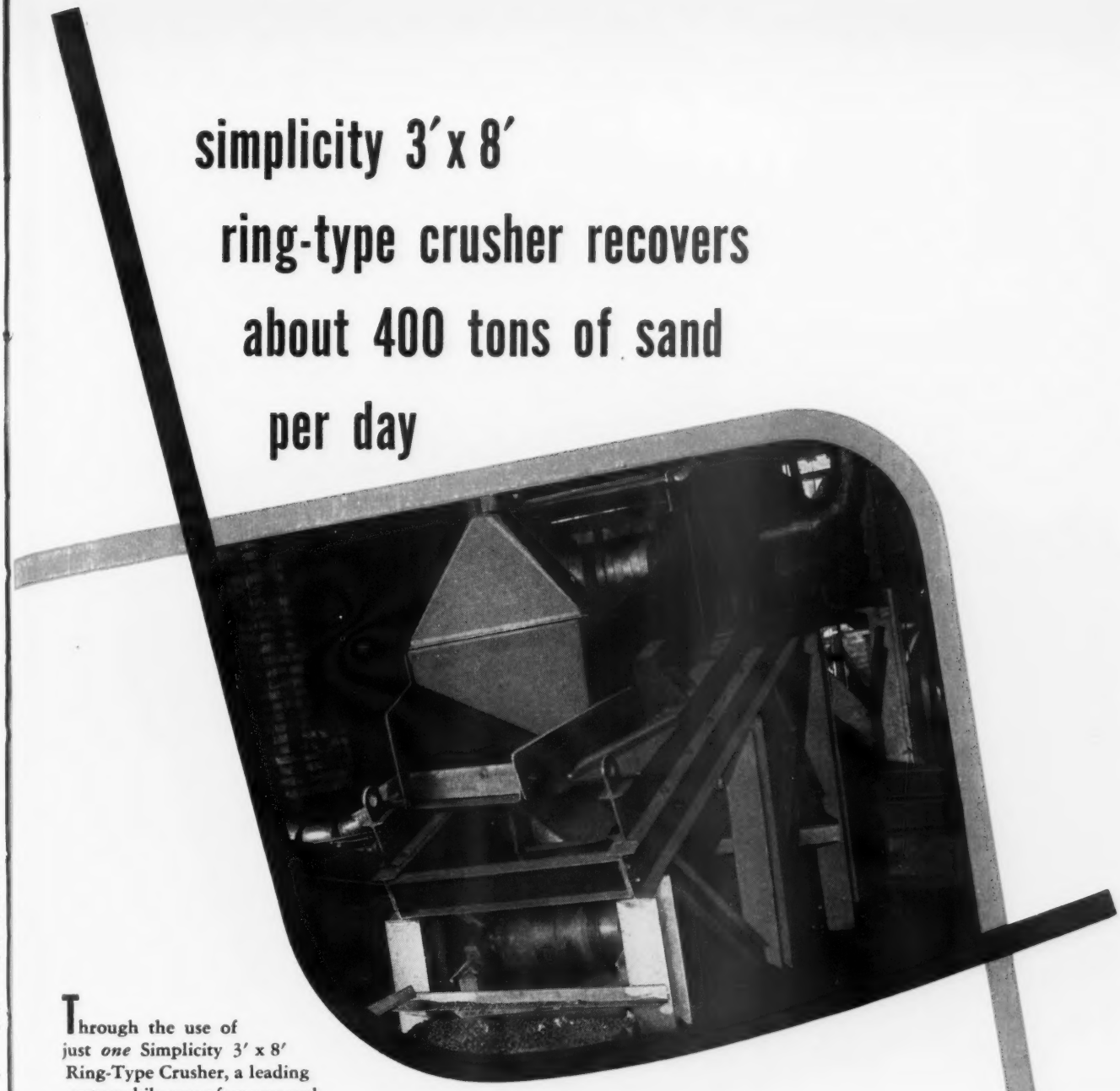
TO THE EDITORS:

I retired Nov. 1 to take effect on Jan. 1 and am going to live in Florida. Will be at 110-18th Avenue South, St. Petersburg, until I can find a home.

I regret leaving New England where I have so many dear friends and shall also miss the enjoyment I always had working with the boys in the New England Foundrymen's Association. I have been on the job for the Tabor Mfg. Co. since 1909 and believe I am entitled to take a rest and let some young man take over.

HARRY W. IMPEY

simplicity 3′ x 8′ ring-type crusher recovers about 400 tons of sand per day



Through the use of just *one* Simplicity 3′ x 8′ Ring-Type Crusher, a leading automobile manufacturer realizes savings of about 400 tons of sand daily in grey-iron foundry operations. In this installation, lumps of sand, especially those from cores that do not break up in shakeouts or screening, are fed to the Simplicity Crushing Screen instead of being hauled to the dump, as is the practice in many foundries. The recovered sand is returned by conveyor to sand storage and mulling equipment thus making appreciable savings in new sand requirements as well as eliminating the cost of hauling away sand lumps. With a Simplicity, one unit does both crushing and screening. It gives positive crushing action and maximum production of grain-size sand. Simplicity Crushers are available with either one, two, or three sets of rings, depending on the lump size to be crushed.

Simplicity Crushing Screens are in profitable operation today in foundries producing magnesium, aluminum, steel, malleable iron, and grey iron castings . . . why not put one to work in your foundry?

A Simplicity sales engineer will be glad to give you the full story. Write us.

103

Sales representatives in all parts of the U. S. A.

FOR CANADA: Canadian Bridge Engineering Company, Ltd., Walkerville, Ontario

FOR EXPORT: Brown and Sites, 50 Church Street, New York 7, N. Y.

Simplicity
TRADE MARK REGISTERED

ENGINEERING CO. • DURAND, MICHIGAN

Economy-minded foundrymen requiring foundry flasks invariably specify STERLINGS. Why? Because they know, when they buy the best, they're bound to get a bargain! STERLINGS last longer . . . *much longer than ordinary flasks* . . . because they are fabricated from special hot rolled steel channel having a tensile strength of 70,000 lbs. They can take hard punishment, day after day, for years. That's why Sterlings actually cost less.

Get all the facts! Write today for your copy of Sterling Flask Catalog.

Sterling

WORLD WIDE SERVICE

STERLING WHEELBARROW CO.
Main Office and Plant • Milwaukee 14, Wis., U. S. A.
Branches and Dealers in Principal Cities

Subsidiary Company
STERLING FOUNDRY SPECIALTIES, LTD.
London, Bedford and Jarrow-On-Tyne, England

Manufacturers of Foundry Equipment for Almost Half a Century

A 7711-1PC

Then What Happened?

We seem to have become an industry of worriers. If backlogs fall below a six to eight months level we are sure that tough sledding lies ahead. If demand will not provide two shift, six day operations, we complain about business and fear for the immediate future of the castings industry. After listening to these laments, one wonders if the picture can be as gloomy as some foundrymen proclaim.

To illustrate, let's go back to the late fall and early winter of 1952. Foundries had enjoyed nine months of exceptionally good business but many saw trouble ahead. Backlogs were down, some plants were working on almost a hand to mouth basis, and while the favors of the past were appreciated, prospects for the coming year were not considered good.

Then what happened? While returns for 1953 are not complete, Department of Commerce reports show the castings industry has been doing mighty well. Production for the first nine months of 1953 was 13,504,173 tons, compared with 12,268,508 tons in 1952. This is a gain of 1,135,665 tons for the first three quarters of the year. Of course, business has been off recently, but it is doubtful if this has been sufficient to bring 1953 production much below that for 1952. And believe it or not, castings production in 1952 was the second highest in history.

Just what are we complaining about? Can't we provide profitable operations unless we are riding the crest of war or post-war booms? Have we lost the ability to conduct a profitable business under somewhat normal conditions, namely small backlogs, rush orders wanted yesterday, and intense price and service competition? An industry with such a splendid heritage of rugged individualism surely is not ready to join the wolf pack crying the doom of good business.

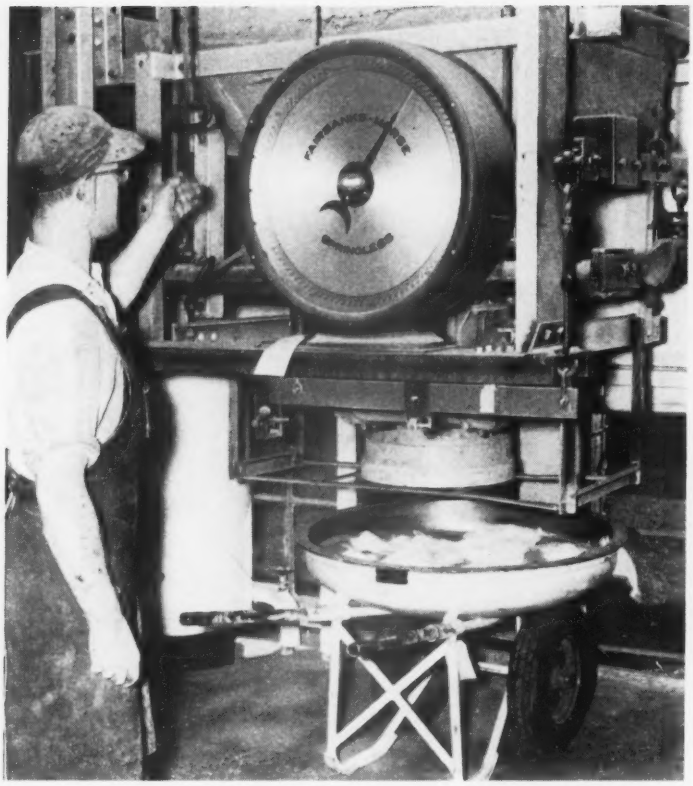
Business experts are predicting everything from a slight increase to a 10 to 15 per cent decline for 1954. If there is a decline of as much as 15 per cent, the foundry industry can take it and still prosper. To do so will demand imagination and drive, production of fine quality castings and selling them competitively. Meeting competition can be arrived at only by eliminating waste, improving practices and producing castings that meet exactly the customers' needs. Sharpening pencils will not do the trick.

Beyond that, much new business awaits the wide awake foundryman. Many companies recently have done excellent work in converting other forms of fabrication to castings. The field has only been scratched.

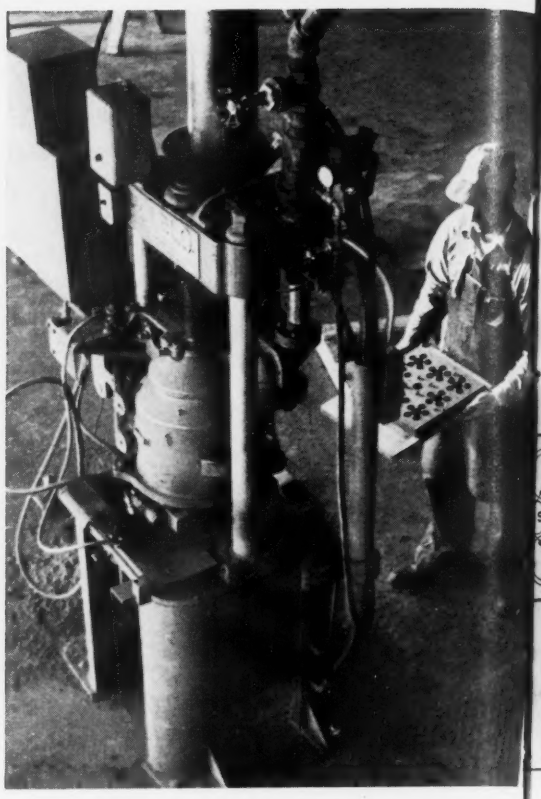
So let's throw away the crying towel and get busy on the job ahead. The market for castings is much larger than most of us have as yet visualized.

Frank G. Steinebach

Editor



Core sand from silos is fed to a batch weigh hopper, then dumped into the muller type wheelbarrow



Operator takes mold section from core blowing machine and puts it on shelf of tower oven at his left

All-Electric Operation Features Modern

PERMANENT MAGNE

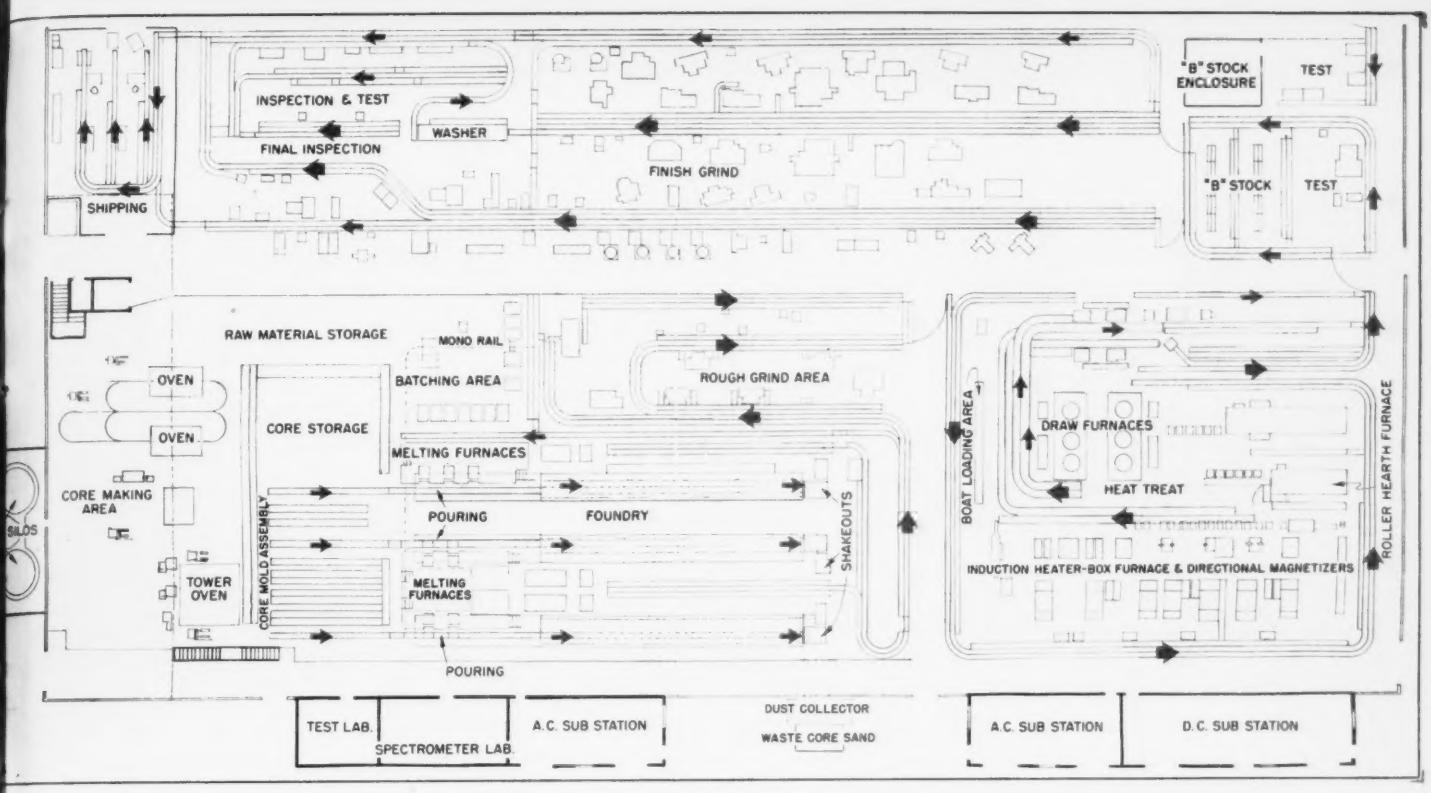
IN THE middle of the corn and pickle fields of central Michigan on the outskirts of Edmore stands the new, all-electric permanent magnet foundry of the Carboloy Department, General Electric Co.

Put into partial production late last summer, the plant has a two-shift, five-day operational capacity of 12,500 to 40 000 pounds of finished castings per week, depending upon which group of the 1600 sizes and shapes of magnet castings are being poured. First-shift operations are manned by 175 employees, and 100 employees are on the second. Heat treating, comprising third-shift operations, is handled by 25 men.

The new plant has a floor area of 128,939 sq ft. Of this, 76,480 sq ft is used for manufacturing permanent magnets, both cast and sintered; 41,612 for making carbide cutting tools and 10,847 for office space. A service building has 20,000 sq ft devoted to raw materials storage, a tool room and machine repair section. Here all patterns, dies and fixtures are made and maintenance and repair work done. Hydrogen used in the plant is generated in the boiler house which also produces steam to heat all the buildings.

Dirt, dust, smoke and fumes are removed from the manufacturing building by a compensating air system which removes over 1 million cu ft of air every four minutes, and brings in 106,000 cu ft of outside make-up air per minute to balance out the air naturally entering through doors and windows. Ample electric lighting is provided by fluorescent tubes in the low bay section, and mercury vapor-incandescent lamp combination units provide high intensity light with the necessary color correction in the high bay section. Shower, locker and wash room facilities for 130 women and 382 men incorporate a separating wall that can be moved to accommodate different proportions of men to women if a change in employment practices dictates.

Prime consideration for placing the foundry and other production facilities in the midst of farm country was the availability of workers from Edmore and surrounding communities. Major highways and a railroad adjoin the property, and electricity is available from Grand Rapids and Alma. All permanent magnet foundry operations are being discontinued at



Layout of the foundry, showing straight-line flow of materials through the four major plant sections

By ROBERT H. HERRMANN
Associate Editor

FOUNDRY

the Schenectady, N. Y., plant and transferred to the new Edmore foundry.

This is a stack molding operation, the stacks being built up of dry sand core mold sections. Dried Junianta bank sand is delivered to the foundry in 30-ton trucks and dumped inside the building through a grating into a below-floor-level hopper at the base of two 250-ton capacity silos. A vibrating feeder at the base of the hoppers feeds sand to a bucket elevator, which carries it to the tops of the silos and discharges it to two chutes, one to each of the hoppers. As sand enters the silos it falls to a shelf near the top, forming a 15-ton capacity active storage area. As this storage area becomes filled, sand spills over the ledge to dead storage in the bottom of the silos.

Chutes from the bottoms of the silos feed sand as needed from dead storage to the receiving hopper from which it is raised to the tops of the silos as described previously. Chutes from the active storage sections lead to a weigh hopper on a mezzanine above the core-making machine area. Lever-operated gates pass sand from chutes to weigh hopper and thence to the

Nuts are tightened on rods of the clamping device which prevents stacked mold sections from shifting during their transfer to the furnaces for pouring

Furnace charges are weighed in tote boxes at batching area. Boxes are to be mounted on castered legs to facilitate their handling at melting platforms

As the molds are poured, a piece of burning paper is used to ignite gases escaping between stacked cores as binders break down from heat of the metal

wheelbarrow type batch muller. Complete mulling cycle is 10 to 12 minutes, and separate core oil or resin binder mixes are used for core blower and jolt rollover machines. Table I shows the various formulations.

Mulled sand is hand wheeled to grated hoppers in the mezzanine floor and dumped in. Hoppers are vibrated and the sand flows through 6-in. pipes directly to the core blowers below. For the jolt rollover machines the sand is deposited on a table and shoveled onto the pattern.

A sand laboratory and a metallographic laboratory also are housed on the mezzanine. The sand lab is equipped with a muller, small corebaking oven, heat treating furnaces for experimental work, and test equipment for determining moisture, permeability and baked tensile strength. The metallographic lab is devoted to product quality control through observation of grain structure and the effect of heat treatment on the various alloys cast. It is equipped with an abrasive cut-off wheel, grinder, polishing table, microscope, small furnace and a hot plate.

The coreroom contains three blowers and five jolt rollover machines. The three blowers and two of the rollover machines are grouped around an electrically heated forced air tower oven. Cores handled in this area range from 6 to 12-in. square and 1 to 2 in. thick; they have from 25 to 40 mold cavities. The tower oven has a capacity of 1200 lb of cores per hour, and they are baked an average of 3 hr at 437° F.

Two rollover machines are stationed in front of a horizontal batch type oven into which cores are hand-pushed on racks of 3½ x 6-ft shelves suspended from an overhead monorail. At conclusion of the bake the racks are pulled out of the oven and the cores allowed to cool before being unloaded. Then the racks are pushed around the monorail, which loops back to the rollover machines, to be reloaded. In the meantime other loaded racks have been rolled into the oven. Capacity of this unit is 600-800 lb per hour.

Cores from the fifth rollover machine are loaded on caster-mounted racks for rolling into a second horizontal batch type baking oven. The two horizontal ovens handle cores from 8 x 8 x 8 in. to 24 x 24 x 5 in. thick. Baking temperature is 437° F and the time between 3 and 4 hr, depending upon core size. Asbestos cement core plates are used to hold all cores during baking.

Practically all of the cores produced form the sections in the stack molds. Eighty per cent of the cores have the mold cavities in the tops of the cores; the bottoms, which form the cope sides of the mold cavities, are flat. In those cases where part of the cavity is in both cope and drag sections, cylindrical cores are placed in small holes in each mold half when they are stacked to align them properly.

Individual casting cavities in the square mold sections are arranged in clusters fed by slot gates attached to radial runners emanating from a central sprue. Top section of the mold stack is simply a slab core into which a pouring basin has been formed around the sprue hole in the center.

As cores emerge from the ovens they are unloaded to asbestos-cement bottom boards on a gravity roller

Molds are broken out on vibrating shakeout at the end of the cooling tunnel; castings are raked into boxes for delivery to tumble, sand-blast machines

Patternmaker puts finishing touches on an aluminum pattern for U-shaped magnet castings. All patterns, jigs and fixtures are produced in the company shop

conveyor aligned in front of the three ovens. The stacks of cores are rolled to roller storage conveyors erected at 90 degrees to the receiving conveyor and which carry the molds in the direction of the furnace and pouring area. Here the mold stacks are built either on the storage conveyor or on the roller conveyor which carries the stacks in front of the furnaces for pouring and through the cooling hood to shakeout.

Stacks are assembled on rectangular steel plates to which is welded a threaded steel rod extending upward at each of the four corners. The stack molds consist of 15 sections, including top and bottom. A second steel plate, having a large hole in the center to fit over the pouring basin and holes at the corners to accommodate the rods, is placed on the completed stack. Hexagonal nuts then are screwed down on the rods and tightened to hold the mold sections in place. Three of the stacks will take the complete heat of one furnace.

Two of the three molding lines are equipped with two 300-lb tilting induction furnaces apiece; the third line has two 200-lb and one 100-lb furnaces. Furnaces are mounted on cement platforms about 2 ft above floor level, and the mold roller conveyor passes along one side at a level about 2 or 3 in. below the top of the platform. This brings the mold pouring basins at proper height for pouring when the furnaces are tipped.

Eighty to 85 per cent of all heats are poured in Alnico 5 alloy. Table 2 shows percentage compositions of the alloys used. Charges are made up in the batching area adjacent to the melting and pouring area of line three and generally consist of 50 per cent home scrap and 50 per cent virgin metal. Tote boxes of charge components are brought in by fork trucks from the receiving and storage building a short distance from the main foundry building, and lined up on the floor convenient to the recording scales. The charge boxes are lifted from the scales by trolley-mounted electric hoists and pushed along an overhead monorail, which is mounted directly over the scale platforms, then makes a 90-degree bend to carry

TABLE I—Core Mix Formulations

Jolt Rollover Machines Core Oil Mix		Blow Machines Core Oil Mix
300 lb	Sand	300 lb
1¾ lb	Cereal binder	1¾ lb
8 qts	Water	4 qts
4 qts	Oil	4 qts
Resin Binder Mix		**Resin Binder Mix**
none	Fine sand	50-75 lb
300 lb	Regular sand	250 lb
2 lb	Cereal binder	2½ lb
7 qts	Water	4 qts
2 qts	Resin	2 qts
5 oz	Sulfonated vegetable oil	5 oz
1 pt	Kerosene	1-1/3 pts

TABLE II—Charge Composition for Various Alloys

(Per cent)

Alnico	Ni	Co	Al	Cu	Zr	Si	Fe	Ti
2	17.00	12.50	10.00	6.00	...	...	54.50	...
3	25.00	....	12.00	...	...	...	63.00	...
5	14.00	24.00	8.00	2.75	0.25	...	51.00	...
6	15.00	24.00	8.20	2.75	...	...	48.50	1.55
7	18.00	25.00	8.50	3.25	...	...	40.25	5.00

Magnets are aligned in "boats" and packed with aluminum oxide before directionalizing heat treatment

After aging, magnets are sand blasted, then demagnetized by passing them through an electrical field

the boxes at 90 degrees to the pouring conveyors just over one edge of the furnace platform on each line.

Charges are weighed in a charging box mounted on castered legs so that when it arrives at the furnace platform it can be rolled to the furnace and then lifted by electric hoist and the contents dumped into the furnace. Weigh tickets showing amounts of charge components go along with the tote boxes as identification to insure that the correct metal is poured into the proper mold.

Iron components of the virgin charge are commercially pure, containing 0.03 to 0.04 per cent carbon, and are 2 x 3-in. pieces of ½-in. plate. Cobalt is added in small rondelles; nickel is in the form of 2 x 2-in. ⅜-in. plate; aluminum is commercially pure ingot; copper comes in cut-up bus bars, and zirconium is added in the form of shot. Some of the alloys contain 0.9 to 4.0 per cent ferrotitanium—an alloy of 50 per cent iron, 40 per cent titanium and 10 per cent aluminum.

Melting procedure consists of melting and bringing to 2912° F all charge materials except the aluminum, zirconium and titanium. At that temperature these three components are added and stirred with an iron rod. Almost immediately upon its addition the aluminum begins to oxidize and the temperature of the melt jumps 212° F. Heating for 2 minutes more brings the temperature to 3236° F, and the molds are poured.

Molds come to the furnaces with a paper towel crumpled into the pouring basin. As the mold is positioned under the spout the operator removes the paper, ignites it in the stream of molten metal entering the mold and lays it in front of the mold to ignite gases generated during pouring. The pouring area is hooded and vented to remove smoke and fumes created by the decomposing core binders.

Two test bars are poured from each heat. One is analyzed by direct-reading spectrometer for metal content, the spectrometer room being located on the main floor adjacent to the pouring station on line one. In the event that any discrepancy in the desired analysis is found, castings poured from the questionable heat are caught after shakeout and before sorting or grinding work is performed. The second test bar is sent to the metallographic lab where it is heat treated, then magnetized and tested for magnetic strength. Here again substandard castings are caught and returned to melting department before any work is done on them.

Poured molds are pushed along a hooded and vented roller conveyor 96 ft long where they are allowed to cool for 8 hr, providing ample time for heat of the metal to disintegrate the cores as much as possible. In consequence the night shift works on molds poured during the day and vice versa. Sand falls from the molds on the conveyor through a grate to a below-floor-level vibrating conveyor which also picks up sand from the shakeout at the end of the roller conveyor and discharges into a belt conveyor, leading to a bucket elevator outside the building where sand is raised to a 30-ton capacity bin supported about 10 ft above ground level on steel legs. Periodically, dump trucks carry sand discharged through a gate

General view of the rough grinding section in the foreground. Finish grinders are in the background

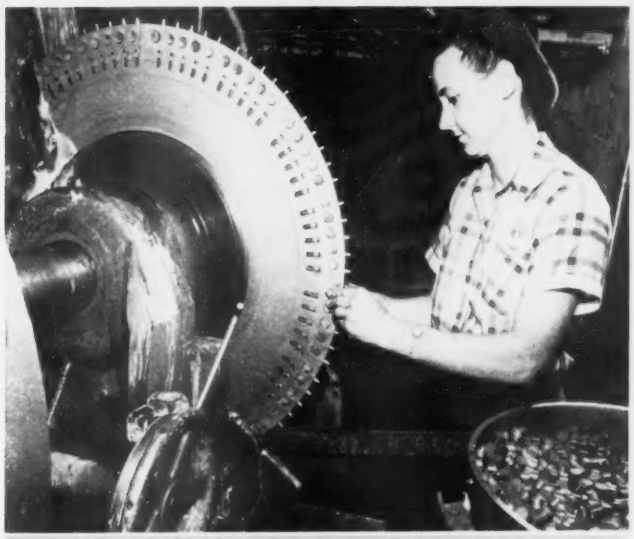
in the hopper bottom to a dump.

The vibrating shakeouts at the ends of the three pouring lines are 3 x 5-ft units. They also are hooded and vented. Castings and gate metal are shaken off into tote boxes on the floor in front of each shakeout. Gates and castings for the smaller magnets are cleaned in tumble, sand-blast units at the side of each shakeout. The larger magnet castings and gating metal are cleaned in a reach-in type sand-blast cabinet near line three. Metal is discharged from the blast units to tote boxes and placed on waist-high roller conveyors for sorting of castings from gate metal.

Castings are put into 12 x 24 x 5-in.-deep stacking tote boxes and the gating metal into larger boxes. Scrap is sorted according to the analysis shown on the original charge tickets and rolled back to the batch weighing area with the tickets being held on the boxes by permanent magnets.

Boxes of castings are rolled either to storage on roller conveyors extending into the area between the cooling tunnels of lines one and two or to the rough grinding area. Equipment here consists of six double-end stand grinders and two centerless grinders located along the roller conveyor loop. Castings are ground to ±0.010-in. and are inspected visually before being rolled to the heat treating section.

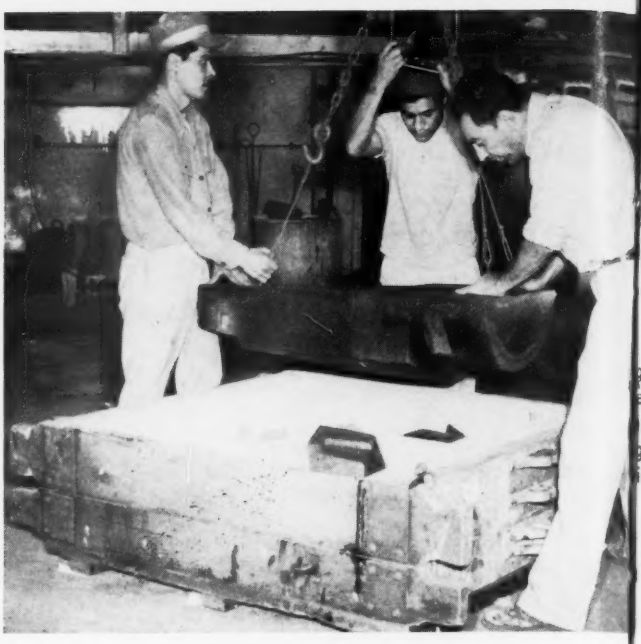
Upon first entering the roller conveyor loop surrounding the heat treat department, they are removed from the tote boxes and placed in proper alignment into shallow metal trays called boats in preparation for directionalizing heat treatment. These boats measure 5 x 18 in. by 1 in. deep. The work is done carefully to obtain good magnetic alignment necessary for high-quality magnets. Granular aluminum oxide is used as packing material. Castings handled in this manner (*Please turn to page* 206)



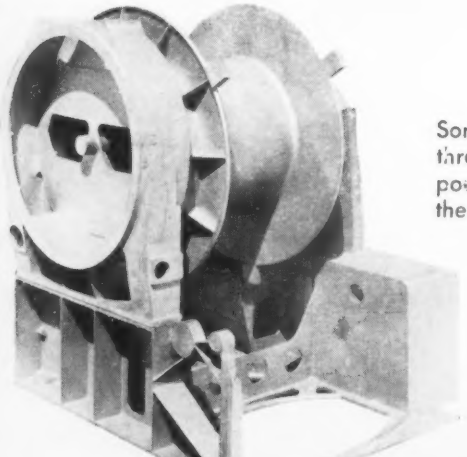
Cylindrical castings are finish ground in disk-type fixtures which revolve between two grinding wheels

Testing ring magnets for magnetic strength. Testing equipment is designed for every casting shape

William Brown, assistant chief engineer at Osbrink, is holding an intake airduct



SAND



Sonar reel cast in three pieces is 15 pounds lighter than the fabricated reel

Hugh Cripe, assistant general manager, compares airscoop with riveted vanes with a less expensive cast air scoop

By LEWIS B. REED
Industrial Heating Consultant
Los Angeles

ALUMINUM and magnesium alloy sand castings produced by a foundry in Los Angeles are proving a surprise to aircraft manufacturers and those persons who think they know the limitations of sand casting. Castings with a wall thickness of 0.100-in. are routine. Normal surface roughness is 100 to 125 microinches, rms, with 100 rms finish provided when specified. Radar wave guides varying from straight tubes to double goose neck bends are cast with terminal ends cast integrally. Interior finish of the wave guides as cast is 100 rms or better. Certain wave guides specify interior surfaces be held plus or minus 0.003-in., and the actual variation is only plus or minus 0.002-in.

A leading edge for an aileron is 7½ ft long and is cast with an over-all tolerance of 0.030-in. All wall thicknesses of the leading edge, with the exception of the hinge lugs, are 0.100-in. Numerous aircraft components are cast, including aileron sections, dive flaps, hatch frames, wing components and guided missile components.

Sand foundries have devoted much time to selling industry on the advantages of castings over certain fabricated parts. A large majority of this foundry's work does replace fabricated assemblies, and two items show just how great the advantages can be. An

ft – Core is lowered to mold in experimental foundry, where all jobs are run first to establish procedure

ght – A worker puts the finishing touches on a mold that is being made in the Osbrink production shop

DCASTINGS *Can Be Made to Close Tolerances*

Intricate aluminum and magnesium parts made to unusually close tolerances by the R. H. Osbrink Mfg. Co. of Los Angeles demonstrate that with the proper know-how, close attention to details, and modern equipment, it is possible to attain a high degree of dimensional accuracy in sand castings

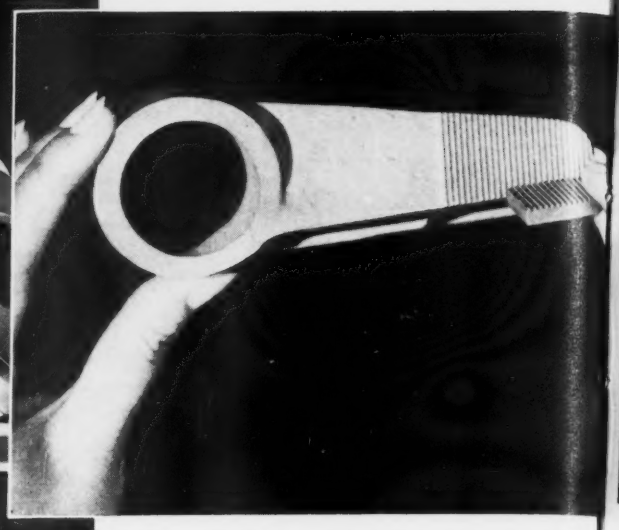
aircraft airduct has been cast in one piece, 13½ in. high, 19 in. wide and 28½ in. long. The casting involved $22,500 for production pattern equipment, and the piece itself cost $750. Fabrication tooling would have come to $131,000, and the fabricated part would have cost $1733.

Component parts in production for a sonar assembly constitute five pieces which comprise the complete structural assembly, even to the conduits for cable wiring. Wall thickness throughout is 0.100-in., and the weight of the magnesium cast assembly is 15 lb lighter than that of the fabricated one. Despite its light weight, shake table and drop tests established the casting as far superior structurally.

These examples cover only a very small part of the precision work done at R. H. Osbrink Mfg. Co., but they do indicate why the castings have aroused as much interest in the aircraft and electronic industries as they have. As a result of this interest, the company has received many plans of parts now being fabricated, with requests that engineering data be supplied for cast pieces to replace the fabricated parts. Also being received for consideration are plans of pieces formerly thought to be uncastable. Much of the foundry's work is far from being routine, and its success with difficult castings is noteworthy.

The highlight of present plans is several contemplated sand-cast wing projects which are being studied for various aircraft companies. One study proposes a wing approximately 5 ft wide inboard and 15 ft long, with a root 6 in. thick. Methods are being considered to cast the wings in single pieces consist-

Like the view above, this illustration shows a mold being finished in the production shop



A serrated arm made in aluminum shows the detail possible with sand casting

Left—Aileron leading edge 7½ ft long is cast with over-all tolerance of 0.030-in. Walls are 0.100-in. thick. Production-cast in aluminum, it also has been cast in magnesium

ing of top and bottom skins, with all reinforcing members cast integrally.

Currently under way is a project which will be a big step forward in the development of cast wings. Patterns and flasks have been fabricated for casting a wing section 6 ft from leading to trailing edge, approximately 6 ft long, with a 6 in. root at the inboard end. Upper and lower skins will be cast to airfoil contours. Coring is devised in such a manner as to cast structural ribs, antiflutter ribs, access holes, aileron mounting brackets and attachment hinge in one, integral unit.

Similar cast wing members have indicated they will take well over 165 per cent of ultimate design loads and are therefore more than satisfactory from a structural standpoint. The current objective is to establish procedures and device techniques permitting routine production. The foundry is positive that its past experience has shown that large cast wing units can be produced in substantial numbers.

The foundry, aviation and electronic industries seem to believe an unusual process deserves the credit for the type of precision work done at this Los Angeles foundry, and this article has been written to describe what is referred to as the Osbrink Process. It is not a personality sketch, but anything written about the process should describe R. H. Osbrink and mention his background, for the process, the company and all the results are solely the work of this man and his experience.

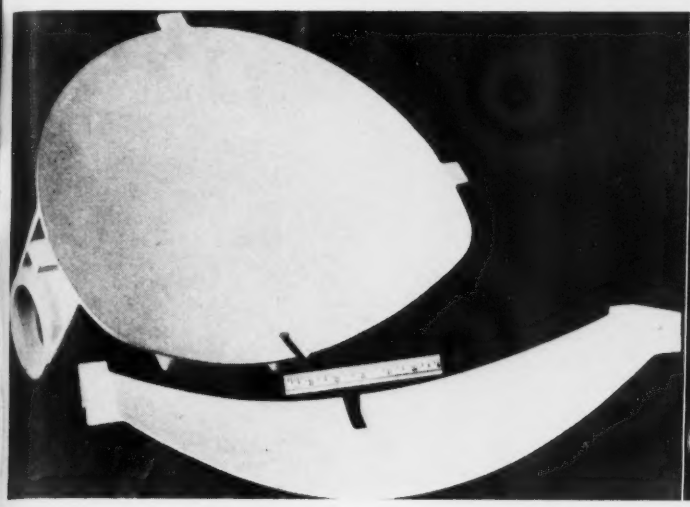
He is of 100 per cent Swedish descent and served an early apprenticeship in his father's blacksmith shop. Several years later, while working in a machine shop on crude sand castings, he developed a desire which has become his life's work—making sand castings which are ready for use with a minimum amount of machining. Over the years, this desire has developed into a passion for accuracy and control—accuracy and control such as only his Swedish forefathers knew, plus the improvements of modern production methods.

When he calls his sand casting procedure the "Osbrink Process," he is underselling himself, for he does not achieve his remarkable precision workmanship by methods or materials known only to him. His results are being achieved by using the same sand casting methods and materials which have been in use for hundreds of years.

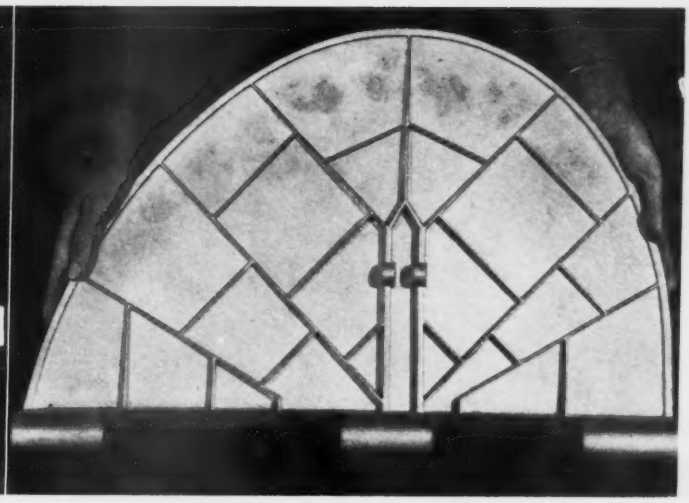
Results are obtained by superb "old world" craftsmanship, inherent "feel" for casting, exacting precision and control and by a group of well-trained, loyal employees who do their utmost on every task. The March, 1953, issue of the Los Angeles Department of Water and Power *Production Expediter* aptly described the process as "a passion for meticulous attention to an infinite number of seemingly minor details, plus the incorporation of the most modern and up-to-date equipment obtainable to facilitate a better product and at the same time reduce the cost to the customer."

Call it what you may, the results speak for themselves.

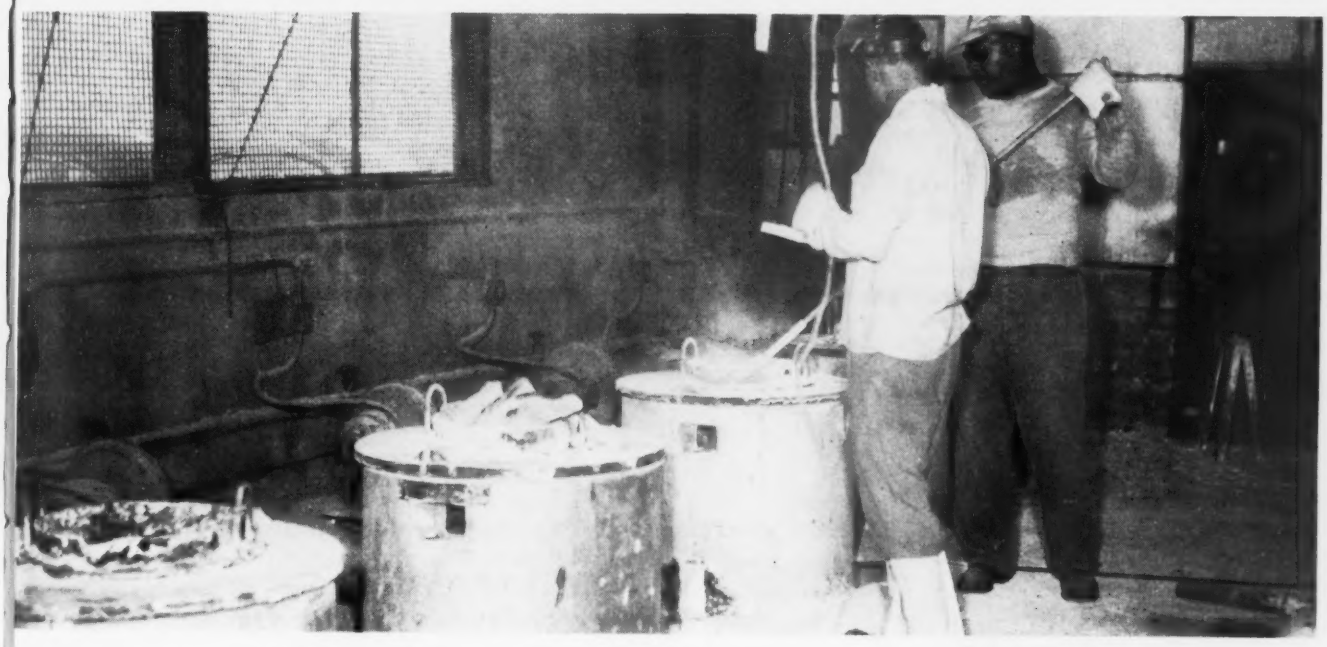
The process starts in the engineering department, where all plans are carefully examined to see if the parts are designed to utilize fully the advantages of the company's experience in sand casting. Sugges-



Magnesium radar antennas like the two shown above are held to true parabolas within 0.005-in.



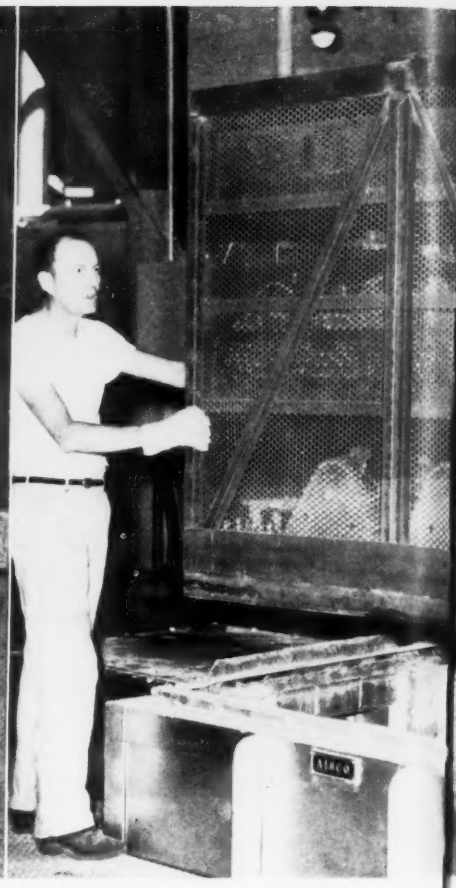
This view shows a magnesium wing door. Thickness of the skin and the ribs of this part is 0.060-in.



Workmen above are in the section of the plant where the magnesium melting furnaces are located

Electronic oven is used for small cores. Another one, built to specification, may be installed soon

The pouring procedure shown here is typical of that used at Osbrink. All molds are hand poured



High-velocity circulating air furnaces like this one are used for the heat treatment of castings

tions are often made when it is felt improvement is possible. Sometimes a redesign is offered to show how a better casting may be obtained. Several elements of what the foundry considers good design based on the strength-weight concept follow:

1. **Fillets**—Large, unwieldy fillets induce shrinkage inequalities and do not produce a stronger junction. Fillet radius of 1/64-in. minimum is considered desirable.

2. **Draft**—Because excessive draft adds weight and produces structural weakness resulting from uneven shrinkage, it should be avoided. Draft is eliminated where possible or is held to the minimum.

3. **Junctions**—Since shrinkage is directly in proportion to the volume of metal, stronger junctions can be achieved by offset ribs or webs.

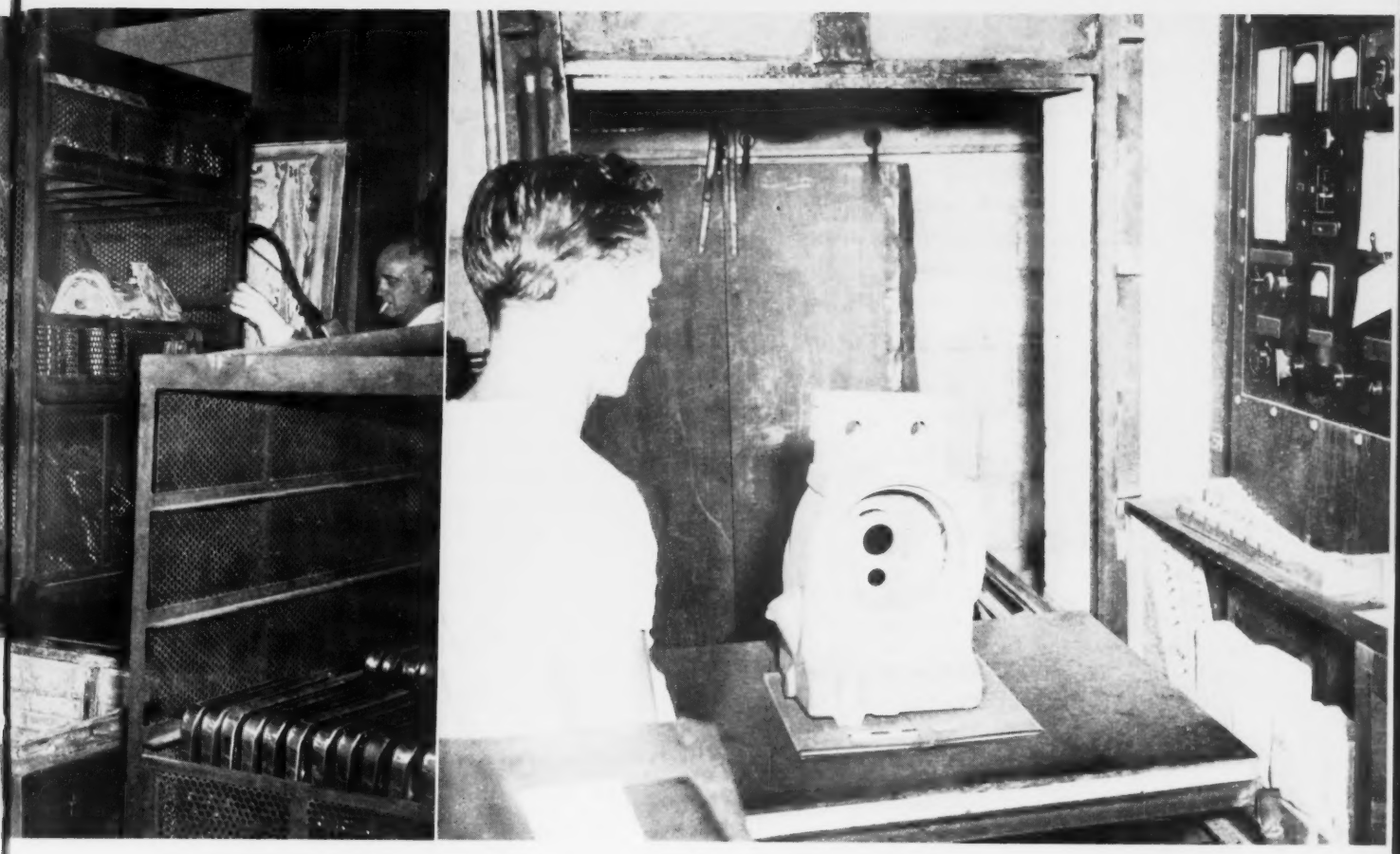
4. **Unequal Sections**—Unequal thickness of joining sections sets up internal shrink stresses which cause flaws and deformations. Where possible, equal wall thicknesses are maintained.

5. **Strength of Sections**—By holding to close tolerances and nominal machine finishes, various parts requiring machining, such as bosses, yokes, clevises, etc., can be cast to size and much reduce usually required machining. This procedure provides stronger parts since thin as-cast sections are stronger and have finer grain structure than larger cast sections machined down to the same size.

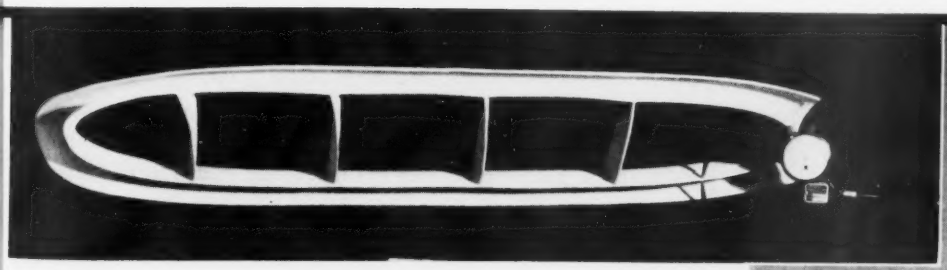
An experimental foundry, with 6000 sq ft of floor space and complete facilities, is devoted to making "first article" castings and to research work. Constant research is carried on to develop new molding techniques and sand mixes that produce fine finishes. New patterns do not have gates and sprues incorporated into them until molds with experimental hand-cut gates and sprues have produced quality castings. Approval of final test castings made in the experimental foundry demonstrates the owner's precision complex. The test castings are given a thorough check for dimensional accuracy and finish, and proper metal density is radiographically established.

Before patterns are put into production use, consequently, castings made from the patterns have passed a check for dimensional accuracy, correct gating and spruing have been proved, foundry technique has been established for the particular casting and quality controls have been formulated. Also, heat treating the test casting establishes heat treat procedure. By the time the casting is customer-approved, everything is in order for the continuous production of precision castings. This system eliminates holding up production facilities to correct techniques.

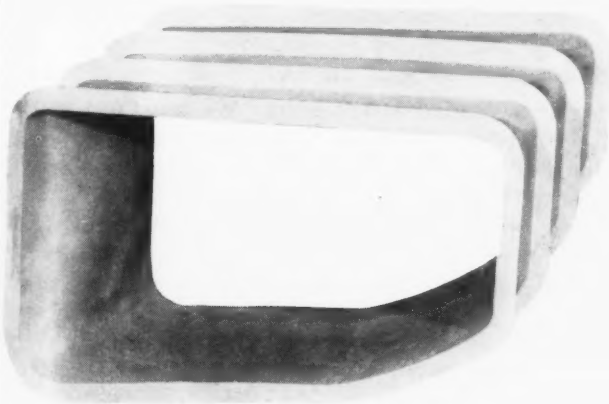
Gating is one secret of (*Please turn to page* 235



Osbrink maintains its own x-ray laboratory to check proper density of experimental castings and for daily quality control of production castings



This view shows an airscoop leading edge which is cast in aluminum with wall thickness of 0.100-in.



Magnesium air duct is an example of the work the foundry can do

The young lady is holding a carburetor air scoop which, like many of the castings made by Osbrink, is for aircraft use. It also is cast in magnesium

a message to management

The Engineer's Role in the

The Mechanical Engineer

By B. C. YEARLEY, National Malleable & Steel Castings Co.

THE almost universal desire of the foundries of this country to hire engineers is an example of the revolutionary changes which have taken place in this industry in the last thirty years—revolutionary because not many years ago it was ill-advised for an operating man in a foundry to advertise the fact that he was a graduate in engineering. It was no suprise to me, one day in my early years in the foundry, when one of our molders met me when I was dressed in my street clothes and said, "Why, Mr. Barney, I didn't know you. You look just like a college graduate."

It was not surprising that college men were in those days viewed with distrust and disdain. Workmen in the foundries were true artisans in that they were able to produce an acceptable product even though the materials available were very crude. These workmen had learned by years of trial and error how to use materials which by present day standards were far from perfect.

The general attitude of old time foundry workers

The Metallurgical Engineer

By C. W. BRIGGS, Steel Founders' Society of America

THE foundry industry is basically a metals industry; therefore if the foundry operations are small and the presence of only one engineer seems feasible on the foundry staff, this engineer should be a metallurgical engineer. A number of foundries do have only one.

I have been told that many foundries do not have engineers on their staffs. To my knowledge, 62 steel foundries out of a listed 300 do not have foundry engineers. It is true that these foundries are small; approximately 75 per cent of the 62 do not produce over 100 tons of steel castings per month.

The managements of several of these small foundries have been questioned regarding their need for a metallurgical engineer on their staffs. Their answer is uniformly the same; namely, that they cannot afford the luxury of a staff man. In some cases, the engineer is a member of the staff, but he has another position to which he devotes most of his time, such as that of foundry superintendent, sales manager or, in three cases with which I am familiar, company president.

The Industrial Engineer

By W. S. WILLIAMS, Lynchburg Foundry Co.

COMPARED with metallurgical and mechanical engineering, the field of industrial engineering is very new; certainly it is new in its application to the foundry industry. I don't believe that any one foundry today is qualified to say just how industrial engineers should be used.

Our foundry is still in the process of trying to work out an organization where it can get the most use from industrial engineers. We use them and we feel that they are very effective, but our organization, we know, leaves very much to be desired. Any student of industrial organization would undoubtedly throw up his hands if he saw our organization chart, at least as far as industrial engineering goes.

We do not have an industrial engineering department as such. We have a group of people in staff capacity who perform industrial engineering functions, and in that group, of course, we have industrial engineers proper. The rest of the group is made up of standards personnel and of a third branch, which

ihe Foundry

Where does an engineer fit into the operation of your foundry? This discussion of the utilization of engineering talent in foundries, presented at the 1953 advisory committee conference of the Foundry Educational Foundation, answers that question

toward new men, especially educated men, was to say, "To heck with that guy. I had to learn the hard way. Let him find out the same way I did." I am not sure that I blame these men for their attitude. It took a lot of skill and know-how to make a mold which would hold together with a molding sand of only three pounds green strength. It required a lot of experience to ram this same sand to the proper hardness so that it would not blow, cut, scab or swell. These old natural molding sands quite probably had such a poor grain distribution that the permeability was very low and the water content very high. No one had any idea what their hot strength or expansion characteristics were.

The molder had to find out the hard way just how to overcome the natural deficiencies of the molding sand. He did not know himself why he had to ram this sand a certain way. All he knew was that if he did not use the skill which he had acquired by experience, he would make scrap castings and would soon be in plenty of trouble with the boss or, even worse, out of a job.

The coremaker was an artisan. His job was to make various shapes out of sand. The geometric shapes which he formed had to be something more than things of line and beauty; they had to be molded to dimension and able to withstand the erosive action of liquid metals. This coremaker did not know why certain materials helped him produce the desired results. I am sure no core (*Please turn to page* 243)

It seems evident, therefore, that the only manner in which metallurgical engineers may be associated with small foundries of limited production is to be in either production or sales primarily and to use their engineering knowledge to guide the company in the control of the product. Small companies are most anxious to obtain such men, but few are available since these companies do not have training programs and must take successful operating men or salesmen from other sources.

Not only would small foundries not be likely to request graduate metallurgical engineers from universities, but engineers probably would be acceptable for employment only if they started as machine operators and worked their way up. In some instances they could start as chemists, but small foundries often do not employ chemists, either. In addition, this position might be a blind alley, in any foundry, regardless of size.

However, if a graduate metallurgist would undertake a job down the line, he could work up fast, and one or two years at the most would produce staff rank and the salary increases to go with it. He should, however, put on the title of metallurgist, for purchasers of castings are becoming more quality-minded and desire to have their quality requirements impressed upon the engineer of the casting producing company.

Medium Sized Foundries—Many foundries employ metallurgical engineers (*Please turn to page* 247)

is concerned with work simplification, They are the three elements of what would be our industrial engineering department. Let me take up these briefly, one by one.

Industrial engineers proper are the ones who have most direct contact with foundry operations. They work on a project basis, taking certain projects which may be assigned from people higher up the line, or picking up projects on their own from people farther down the line, as they have the opportunity. Those projects may take a day or six months to complete.

Our standards department is an integral part of the industrial engineering setup. It is concerned with time study and with maintenance of an incentive system. We feel that we are up to date on most of this, but we are doing a certain amount of research, trying to find better ways of measuring a fair day's work and determining just what is a fair day's pay.

Work simplification is concerned mainly with two things. We first set up an organized training course in work simplification which we present to supervisors and to staff personnel, and we are now in the process of trying to give to all of our workers at least some amount of work simplification training.

The second portion of our work simplification activities is the "proposal for improvement plan." That is our means of soliciting and receiving ideas from anyone in the shop who has them; it is a channel for evaluating those ideas, for finding out which are good and most important (*Please turn to page* 238)

Several Factors Influence

Linear Shrinkage

By HUBERT CHAPPIE
Foundry Superintendent
National Supply Co.
Torrance, Calif.

What is the proper shrinkage allowance to make on patterns for steel castings? The author explains how various factors prevent the establishment of a fixed rule to cover shrinkage of other than small light parts

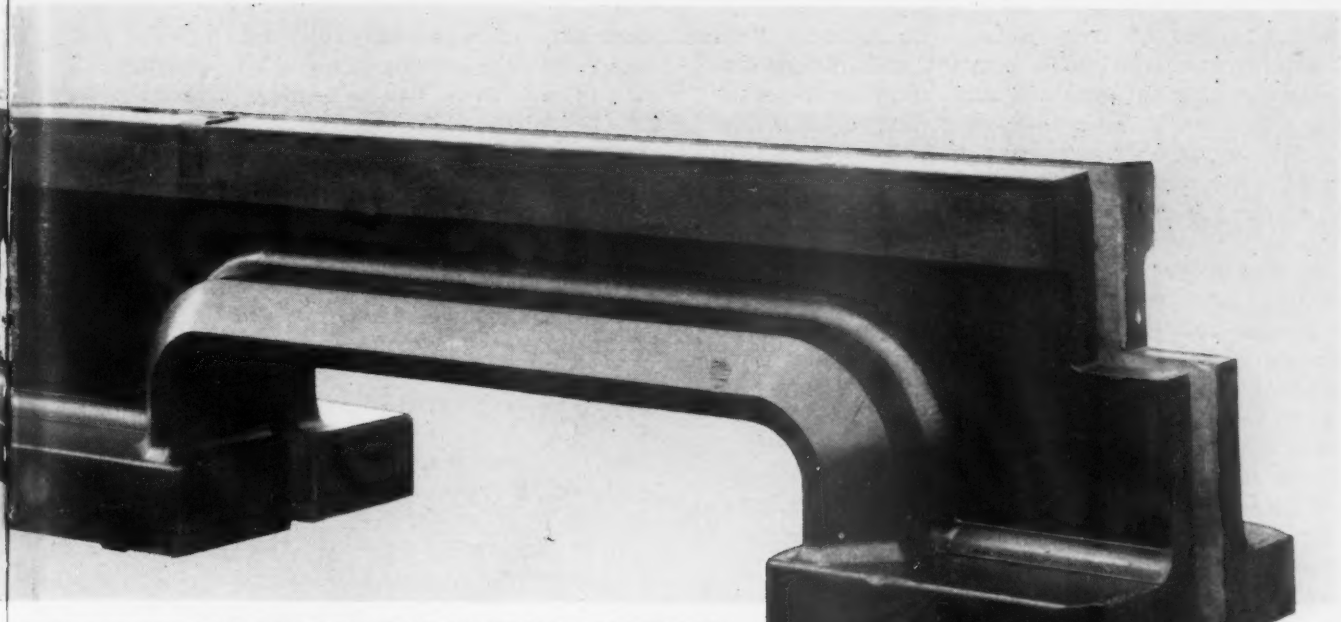
IN GENERAL, when selecting the size of shrink rule to be used in making patterns for steel castings, the usual choice is ¼-in. per foot. This shrinkage is most satisfactory for the average small light casting; however, when making medium-sized and large castings, there is no hard and fast rule. It is possible to have from 5/16-in. to none per foot.

Several different shrinkages may take place in making one casting, depending on the design of the casting and the manner in which it is made. The shrinkage in one foundry will vary from that in another.

Our practice has been that when quoting on large castings—10,000 lb or more—the customer's permission is secured to make the pattern, or if he desires to place the pattern work, we specify how the pattern is to be made, the shrinkage and the amount of finish required.

On one occasion when checking a pattern approximately 48 in. diam and 48 in. high — with a great deal of corework, plus pockets in the cope—the pattern was found to be made with a ¼-in. shrink rule. The estimated weight of the casting was 4000 lb. The outside diameter did not call for any finish, but, the inside diameter of the outer ring did. After reviewing the job, based on past experience, the conclusion reached was that the pattern should be altered to ⅛-in. shrink rule. If the outside diameter were made with a ¼-in. shrink rule but shrank only ⅛-in. per foot, it would be oversize. This would not be harmful, but if the inside diameter were made with a ¼-in. shrink rule and shrank only ⅛-in. per foot there would be no machine stock left.

The customer sent an engineer to the foundry and it was carefully explained to him why the casting would shrink ⅛-in. per foot rather than ¼-in. He replied that another steel foundry had advised him to make the pattern with a ¼-in. shrink rule. He was informed that it is possible another foundry would recommend a different shrinkage. Shrinkage



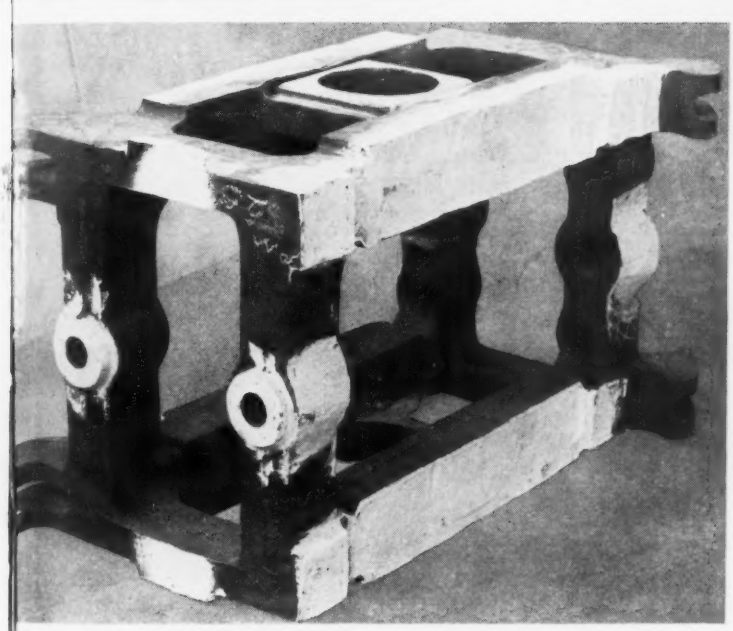


Fig. 1—Slide rail casting 16 ft long weighs 6500 lb. Pattern originally was made with ¼-in. shrink rule. When 2 in. was removed from pattern, making shrinkage allowance ⅛-in. per foot, resulting casting proved dimensionally correct

Fig. 2—Frame casting weighing 2000 lb. Dimensions were satisfactory when pattern was changed from ¼-in. to no-shrink rule

can vary because of the type of sand used, the manner in which the casting is made and the difference in foundry personnel. The engineer agreed to allow us to make the casting as per pattern, and the casting checked with a ⅛-in. shrink rule per foot. Unfortunately, shrinkage cannot always be predicted as accurately as just stated.

A right and left hand slide rail pattern (Fig. 1) 16 ft long was checked and found to be made with a ¼-in. shrink rule. The customer was informed that our previous experience indicated castings would shrink ⅛-in. per foot. As previously, the customer had agreed to give us the opportunity to review the blueprint when they were making the pattern and, having failed to do so, they paid for the expense of removing 2 in. from each pattern to conform to a ⅛-in. shrink rule. Again, fortunately, the castings shrunk exactly ⅛-in. per foot.

A frame casting (Fig. 2) weighing approximately 2000 lb was made with a ¼-in. shrink rule; the casting did not shrink at all and it was impossible to machine and hold dimensions. Again the customer agreed to have us make an entirely new pattern conforming to a no-shrink rule. This casting, due to its design which necessitated the pattern being practically all cores, did not shrink at all. A new pattern was made and casting was entirely satisfactory.

In producing large castings, it is possible to dispose of an oversize casting but not an undersize one. The risk is too great when planning shrinkage to figure a large casting more that ⅛-in. per foot. In fact, we make many large castings with a common rule and if shrinkage does take place it usually gives us more finish to remove. The weight is not a major cost factor as all castings are sold per piece.

If a blueprint is received for a large casting and the dimensions do not call for finish, the customer is contacted for tolerances. If his required dimensions are too exacting, he is informed, and a record of an agreed tolerance is established.

During the past three years a history sheet has been compiled of every outside job ordered. The blueprint is marked with common rule dimensions when checking pattern, then when checking the casting the blueprint again is marked with common rule dimensions, with an identifying colored crayon. Marking the blueprint in this manner enables one to have a deeper realization of shrinkage taking place. In this manner shrinkage is recorded and we are building, through our files, a more complete understanding of shrinkage problems for future use.

Briggs and Gezelus have written some excellent papers entitled "Studies on Solidification and Contraction in Steel Casting" which have appeared in AFS *Transactions*. Here are some highlights of their papers which are pertinent to the subject of linear shrinkage:

"Linear shrinkage takes place from the solidifying temperature of the steel to room temperature. The total *free* linear contraction is about 2.40 per cent.

"Slight variations from the normal amount of the manganese and silicon content in cast steel does not have any effect on the total contraction. The amount of carbon does have an effect on contraction. The data obtained indicates that the contraction varies from 2.47 per cent for a 0.08 per cent carbon steel to 2.18 per cent for a 0.90 per cent carbon steel.

"The total amount of free contraction of cast carbon steel decreases at the carbon content increases.

"A study of the contraction taking place in the cooling of steel castings from the solidifying temperature of the steel to room temperature involves not only the consideration of the character of free contraction but that of hindered contraction as well."

The reason there are variations in shrinkage is due to hindered contraction, which is caused mainly by design and the materials used in molding and coring.

If the design causes hindrance of contraction it may be changed through contact with the customer and his engineers. If materials in molding or coring are responsible, the condition can be accepted or else various methods can be used as a corrective.

Here are a number of factors causing hindered contraction and an elaboration of them:

1. Design.
2. Sand, molding and cores.
3. Green sand versus dry sand.
4. Pockets in cope calling for excessive gaggering and bars in the flasks.
5. Ramming.
6. Several heads on one job.

No doubt there are other reasons, but the above are the most common ones.

1. Design—All of us have made castings in which the design causes restricted shrinkage, thereby lessening the linear shrinkage. Design also causes hot tears, and this defect naturally goes hand in hand in causing restricted shrinkage. It is possible that no matter what means we resort to, hot tearing cannot be avoided; the only alternative, a redesign of the casting, may be to the extent of making two castings and then welding together.

For some reason, beyond the author's comprehension, an engineer or customer will allow a foundry to make two castings and weld them together rather than permit the welding of a crack in a casting. The cost, in most cases, has no bearing; invariably, welding the two castings together is higher. The main advantage in making two castings instead of one is that the linear shrinkage can be held to close tolerance because of accurate spacing before welding; also because of less hot tearing.

2. Molding and Core Sand—The ingredients used in sand are mainly responsible for restricting shrinkage. The amount of silica flour used in sand greatly affects mold or core restrictions, because of the expansion. Quoting from Briggs' *The Metallurgy of Steel Castings*:

"From the work that has been done, it has been established that for steel castings the maximum hot strength at 2500° F for sands probably should not be over 25 psi. If this figure is exceeded by very much, the possibilities of hot tearing of the casting increase. Thus sands and cores, as well as casting design, can be responsible for the formation of high hindered-contraction stress at elevated temperatures."

There are ways of counteracting this expansion through the addition of cellulose materials, also southern bentonite. However, experience dictates that when these materials are used to accomplish their purpose of reducing the expansion which affects linear shrinkage, the casting surfaces are less free from penetration. It is much simpler to weld a crack than

Fig. 3—8000-lb discharge section. No-shrink rule between flanges, ⅛-in. shrink for 56-in. flange

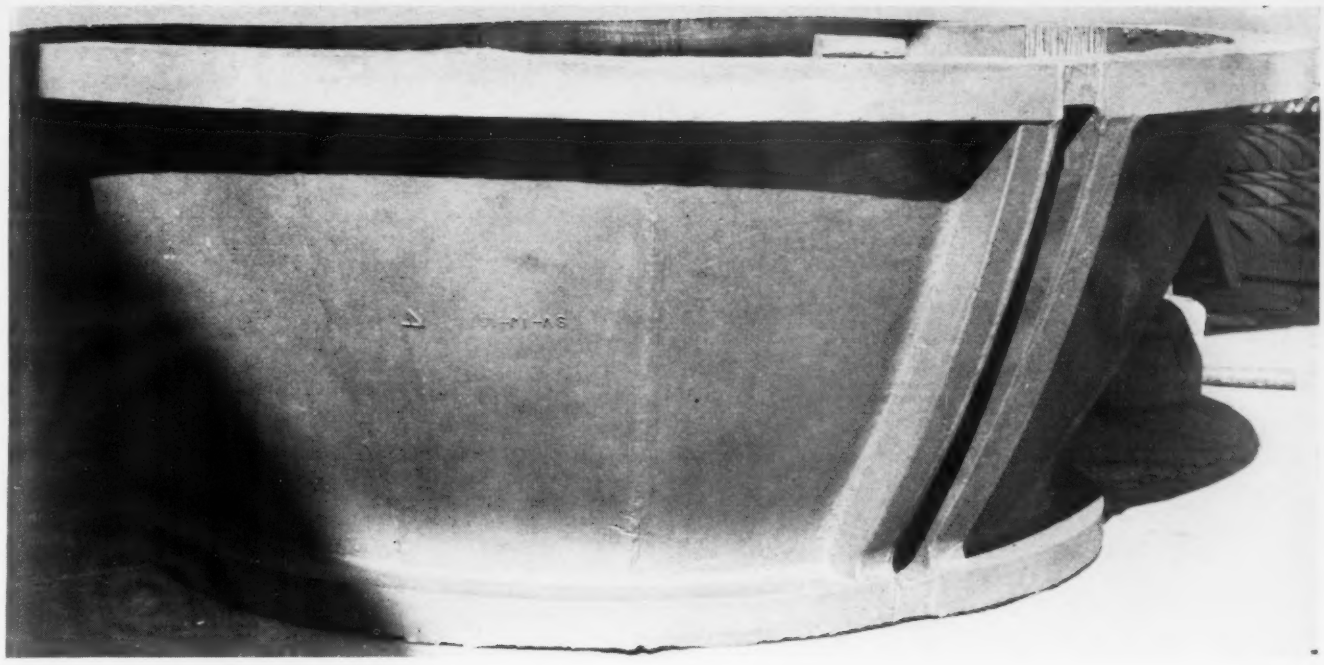


Fig. 4—Body inlet casting 11 ft 8 in. diam. No-shrink rule between flanges, 1/16-in. on inside diam

have loose sand in a casting; it is impossible to remove all of the sand and, consequently, when machining takes place another complaint arises.

Dietert and Valtier, in one of their papers (AFS *Transactions*, 1935) state: "At a mold hardness of 20, the expansion of the sand is .0045 inches per inch and .019 inches per inch at a mold hardness of 96. Expansion is proportional to mold hardness."

When making steel castings, 20 mold hardness is entirely too soft; therefore, some practical mold hardness tests were made at 70, 80, 90 and 96. The expansion at 70 is .016 and at 96 is .018. The difference from 70 to 96 is approximately 10 per cent in expansion.

3. Green Sand vs Dry Sand—Perhaps most of us have had the experience, especially in making rings, where molds in green sand shrink a great deal more than in dry sand. This is only natural because it does not have the dry strength of the sand as a resistance factor.

4. Pockets in Cope—Whenever there are pockets in the cope, considerable gaggering is naturally called for. Also, steel bars must be used to prevent mold strain and to provide an anchor for the attachment of gaggers. It can be easily seen how steel gaggers and bars prevent the mold from contracting, thereby resulting in very little linear shrinkage. Gaggering, no doubt, is overdone, but who can say when a mold has been properly gaggered?

In making miscellaneous large castings one does not take the risk of under-gaggering to the extent of losing a casting. Again, a molder would never want to risk the humiliation of his fellow workers if a cope dropped because of too little gaggering. So there seems little one can do here, but just as soon as the metal solidifies on large castings the bars and gaggers are loosened and in some cases removed entirely. This aids us in getting more linear shrinkage and preventing hot tears.

5. Ramming—The harder one rams, the less shrinkage takes place; also, the finer the sand, the less contraction that occurs. This can be overcome by creating open pockets far enough away from the metal, or by filling pockets with charcoal, coke, sawdust, cinders, or loose sand, allowing the hard rammed sand to move when shrinkage occurs.

6. Several Heads — Rammed sand between heads prevents free shrinkage, according to the measure of hardness rammed. This may be counteracted by placing relieving blocks a few inches from the risers in the direction of contraction. When the casting has been poured and the metal solidifies, the blocks can be removed and the open spaces will offer no resistance to the contraction of the casting. In some cases loose dirt instead of wood blocks is used as a reliever; also chains have been rammed between heads and when the metal solidifies, the entire chain is removed.

Again referring to *The Metallurgy of Steel Castings*: "If a casting contracts only 1 per cent instead of the free contraction of 2.4 per cent, then a stress of approximately 7000 psi will act on the casting because of hindered contraction alone. If, however, the casting is removed from the mold before linear shrinkage takes place, the hindered contraction may no longer be effective, and the stress caused by hindered contraction may be removed".

In conclusion, all factors should be recognized which prevent free contraction. Use the remedies for the cure or definitely take them into consideration when computing pattern shrinkage. The foundry should insist on making its customers' pattern to allow for the proper shrinkage or have an understanding with the customer so that it has the right to dictate the shrinkage and finish allowances. It seems that each foundry must establish its own table for pattern shrinkage, depending on the casting itself and the manner in which the mold is made.

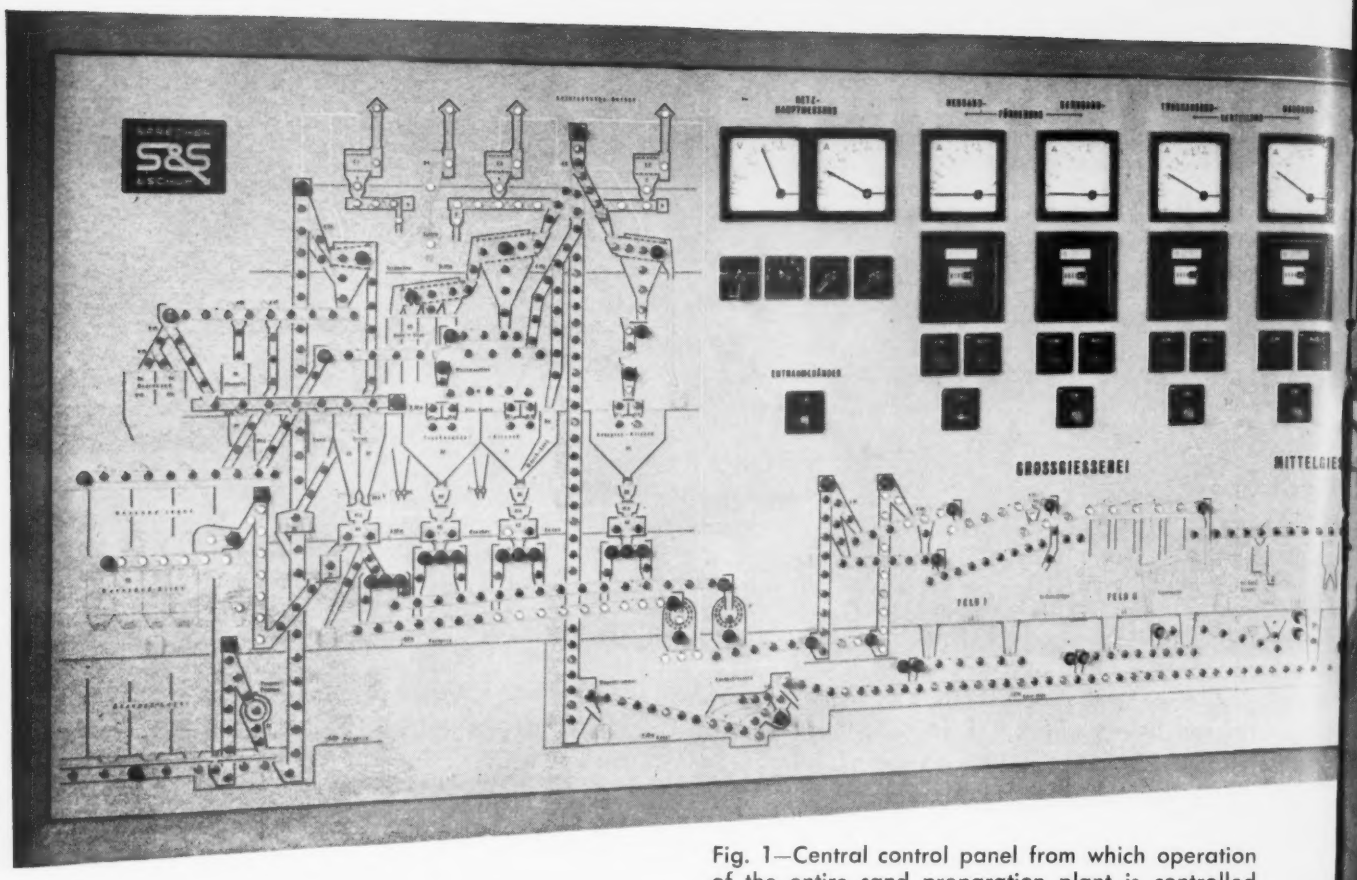


Fig. 1—Central control panel from which operation of the entire sand preparation plant is controlled

MODERN SWISS FOUNDRY

Incorporates Automatic Controls

By DR. VICTOR FREY

Foundry Manager
Escher Wyss Ltd., Zurich, Switzerland

THE foundry of Escher Wyss Ltd. in Zurich, Switzerland, is engaged primarily in the production of single castings for the company's own use. Castings are made in gray iron, ductile iron and nonferrous metals. Production comprises castings for hydraulic and steam turbines, compressors, pumps, blowers and centrifuges weighing up to 50 tons.

Fig. 2—Sand preparation plant at right, bunkers for new sand storage at left

Large-scale alterations completed three years ago transformed the foundry into an up-to-date plant with bright, well ventilated workshops providing good working conditions. At the same time the foundry undertook the production of castings for customers, so that at present the original production range is extended by a great variety of castings turned out in small and medium-sized batches by all the molding departments.

The accompanying sketch illustrates the general layout of the foundry.

Sand Preparation—The building erected for the sand preparation plant is 65 feet high and is separated from the foundry by a lane. It was no simple matter to solve the problem of keeping the molding department constantly supplied with four kinds of sand and removing three kinds of shake-

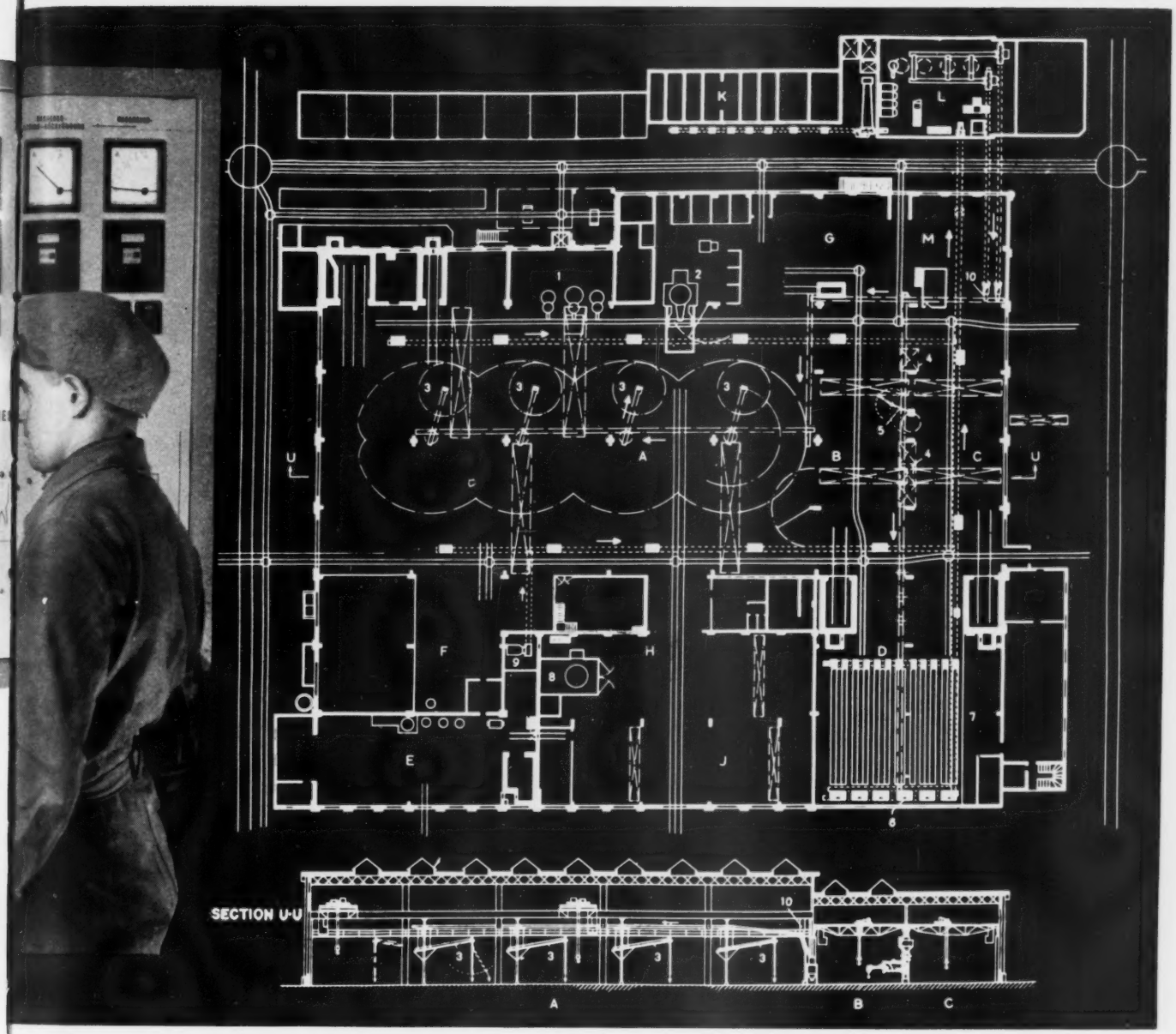


Fig. 3—Layout of the foundry. *A*—Large mold department. *B*—Medium mold department. *C*—Small mold department. *D*—Molding machine department. *E*—Metal foundry. *F*—Large core depatrment. *G*—Small core department. *H*—Cleaning shop for large castings. *J*—Cleaning shop for small castings. *K*—New sand dump. *L*—Sand preparation department. *M*—Apprentice department. 1—Cupola furnaces. 2—Electric furnace. 3—Swivelling sand hoppers. 4—Molding sand bins. 5—Sandslinger. 6—Molding machines. 7—Roller conveyors. 8—Water blast cleaning cabinet. 9—Sand reclamation plant. 10—Bucket chains

out sand. It was achieved with the help of an ingeniously controlled system of conveyor belts having a total length of about a mile. Thanks to a carefully planned central control, which embraces the whole sand preparation plant, staff requirements have been reduced to a minimum. Signaling equipment and telephone connections, combined with an ingenious block system, insure uninterrupted and foolproof operation.

New sand reaches the plant in freight cars and is brought to storage bunkers (Fig. 2) by conveyor belts. For preparation it is taken from these bunkers and carried to the new sand bins by various conveyor belts, bucket chains and conveying-screw systems, passing through a drying drum and a polygonal screening drum (Fig. 7) on the way. The lumps rejected by the screening drum fall into a hammer mill where they are crushed and again pass through the screen until the required grain size is obtained.

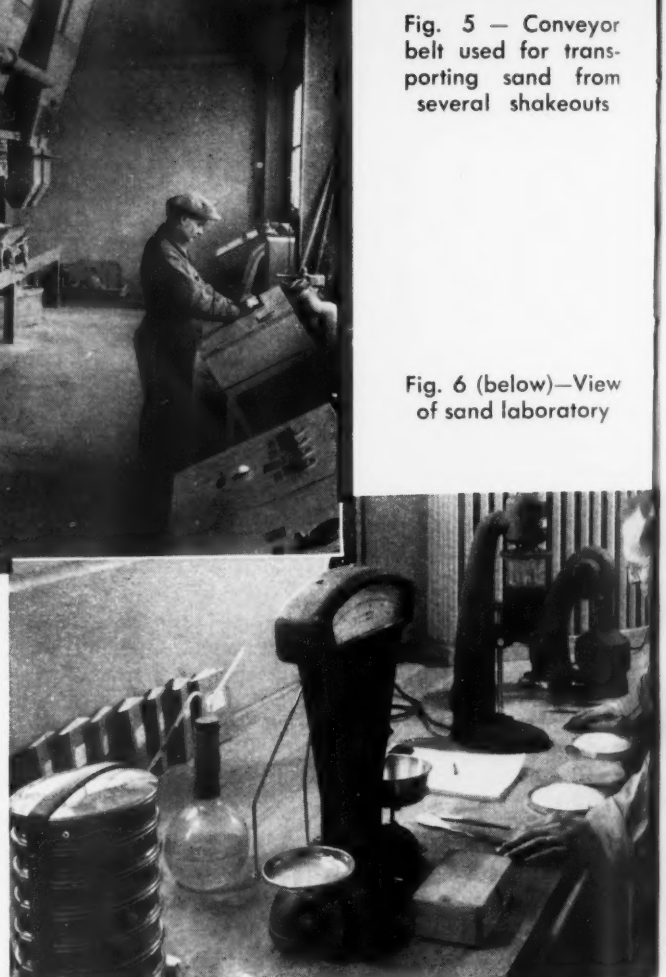
All the sand preparation equipment is hooked up with the dust collecting plant. Exhaust ducts lead to four dust separators installed at the top of the sand preparation plant. The separators function mechanically, and the dust is conducted to the rubbish bin by a closed collector worm. When drying natural bonded sand a system of pipes is put in operation in such a way that the clay is mixed again with the sand shortly before the latter enters the bin.

Shakeout sand is drawn off on conveyor belts arranged in underground tunnels which are accessible for inspection and maintenance. Two conveyor belts

Fig. 4—Sand mixing equipment; control desks at right

Fig. 5 — Conveyor belt used for transporting sand from several shakeouts

Fig. 6 (below)—View of sand laboratory



arranged alongside the two sheds are surmounted by ten large shakeout points equipped with grids. They carry the old sand from the heavy and medium casting shops to the main collector belt. In the small casting shop two additional shakeout grids are installed above the main collector belt which leads directly from the molding machine department to the sand preparation plant. It is connected with two shorter belts that run under the molding machine department. One of them receives the shakeout sand unloaded through vibrating hoppers, the other the spilled sand from the molding machines.

On the return journey the shakeout sand passes first over an electromagnet and then through a hammer mill where the hard-baked lumps are crushed. In the adjacent reciprocator the sand is cooled and the dust removed. Then a second magnet drum removes the remaining traces of iron, after which the sand is carried up to the top of the sand preparation plant by a bucket elevator.

Three kinds of shakeout sand—green molding sand, dry molding sand and washed sand from the wet blast cleaning unit—follow this route alternately for regeneration in the sand preparation plant. Depending on which kind of sand arrives there the transport is directed by a remote-controlled system of swiveling pipes to one of the groups of screening drums. All remaining coarse impurities are elimi-

Fig. 7—New sand passes through drying drum and rotating screens on its way from storage bunkers

nated in the screening drums. The screening equipment for dry sand is followed by a coke sorting drum. Pieces of coke thus recovered, which are used for venting molds and cores, fall after classification into a series of bunkers whose outlets are situated outside the building. The last bunker compartment is reserved for rubbish.

After being sifted the old sand passes through an automatic moistening device and then through a mixing worm. From there a system of conveyor belts carries it to one of three overhead bins. The whole sand return operates practically without producing dust because the shakeouts and belt crossings are appropriately enclosed.

Old and new sand, as well as binders and seacoal, are stored ready for mixing in groups of bins located above the mixers. The various sand mixtures are prepared with the assistance of moveable measuring hoppers arranged under the bins and distributed to the enclosed Simpson mixers.

One man operates the whole mixing plant, his task being limited to serving the equipment for drawing off the sand, distributing the binders and operating the pneumatic outlet in the bottom of the measuring hopper. The actual mixing process, mixing time and water additions are automatically regulated from a control desk. (Fig. 4) Thanks to the effecting elimination of dust the whole sand preparation plant, including the underground tunnels, can be easily cleaned once a week with vacuum cleaners.

The sand laboratory is also worthy of mention. It occupies a special room on the sand mixer floor and checks on the mixtures made each day are maintained.

On leaving the sand mixing plant the prepared sand is distributed to the foundry by two separate belt conveyors, one for dry molding sand and one for green molding sand, both of which can operate at the same time. Depending on the kind of sand required the sand mixers are hooked up with either of the two lines at will. A third unit prepares core and special-type sands which are transported directly by wagon as the quantities involved are small. This mixer also can be utilized for preparing molding sand when the latter is in heavy demand.

On leaving the mixers the sand first passes through two aerators and then falls onto the undeground collector belts which carry it to the foundry. There it is hoisted by two elevators and fed to the distributing belts proper. Alongside all the distributing belts are gangways for servicing the sand removal points and checking the filling of the hoppers.

The entire sand preparation plant, including all the machines and the conveyor belts for the return and distribution of the molding sand, can be controlled and supervised from a central switchboard located on the mixer floor. Fig. 1 shows the functional diagram of the whole installation. The various sand transport routes to and from the foundry, as well as the groups of preparation equipment, are indicated by colored lights as soon as they are set in motion. It is easy to see at a glance what kinds of sand are being conveyed at any given time.

Whenever a group is switched on, a warning signal resounds for 30 seconds. Thereupon the appropriate dust exhaust equipment is automatically switched on, and only 10 seconds later the knobs for switching on the various machines and belts of the appurtenant group are released on the illuminated switchboard. These knobs can only be manipulated in a certain order, in the opposite direction to the movement of the sand. This block system is designed to eliminate all danger of the sand becoming jammed, as might happen if the rear transport units were to function while the forward units were at a standstill. The whole group is also cut out when a single unit breaks down.

A feature of the production of single castings is that the working program of the foundry changes from day to day. For this reason the sand preparation plant must be very flexible and adapt itself to the constantly changing conditions.

For the orderly operation of the whole sand trans-

Fig. 8—Operating swinging tube sand distributor

Fig. 9—Sandslinger rams medium-sized, small molds

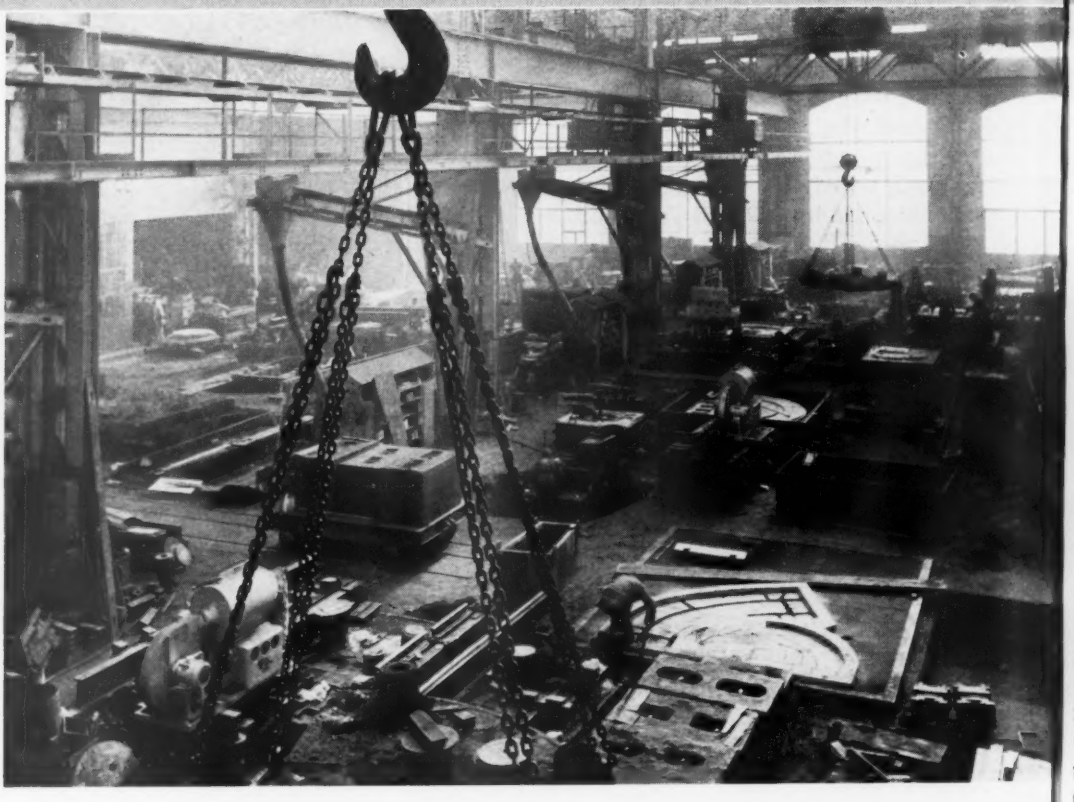


Fig. 10 — General view of large mold making department, showing swivelling tubes for distribution of the molding sand

port system the central sand control point must be linked with the foundry by suitable means of communication. For this purpose a special telephone exchange was installed for ordering the molding sand. Orders specify the type and quantity of the sand required and the place and time of delivery.

A system of light-signals was installed to ensure the orderly return of the old sand. Depending on the type of sand to be unloaded, large transparencies marked "Green Molding Sand" or "Dry Molding Sand" light up at various points. As long as they remain unlighted no sand may be discharged through the grids because it means that sand from the wet blast unit is being returned. As soon as one type of sand has been cleared away notice is sent to the central sand control where the switch-over is immediately effected and the other transparency lights up. Thereupon the appropriate type of sand can be shoveled down.

An important innovation in large-scale molding is constituted by the four swivelling units, each comprising a bin, a conveyor belt and a flexible pipe, for distributing the sand to the various molding areas (Fig. 10). They can turn almost a complete circle

Fig. 11—Part of the machine molding department

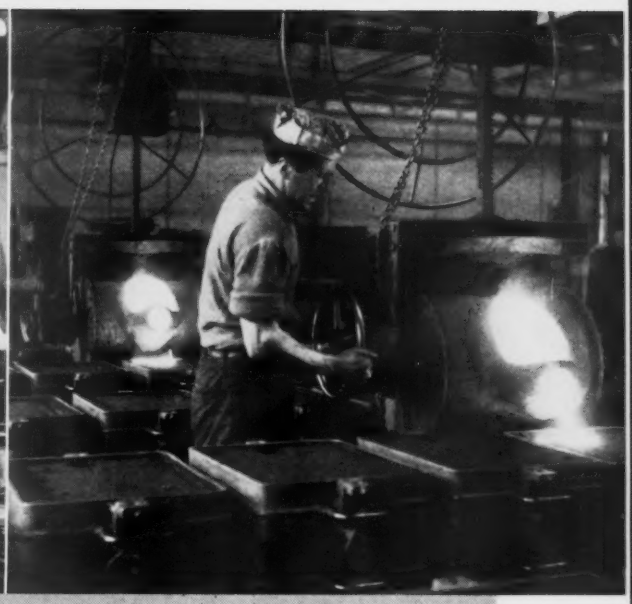


Fig. 12—Pouring molds from suspended ladle

and have a working radius of 33 feet.

An operator can switch the conveyor belt on and off at will by means of a switch on the end of the pipe and distribute the sand by moving the lightweight tube (Fig. 8). In the medium-sized and small molding shops the expected increase in production was achieved by means of a sandslinger. The latter is of the stationary type with a ramming head that can be raised or lowered.

This method of sand distribution, combined with the mechanical return of the old sand, results in tidiness in the plant and eliminates the usual mounds of sand, the mobile sand preparation machines, the shovels and the sand carts. But its chief advantage is the greater floor space available for actual molding, which increases the output of the foundry without altering its dimensions. The cost of transporting the sand by hand is also eliminated.

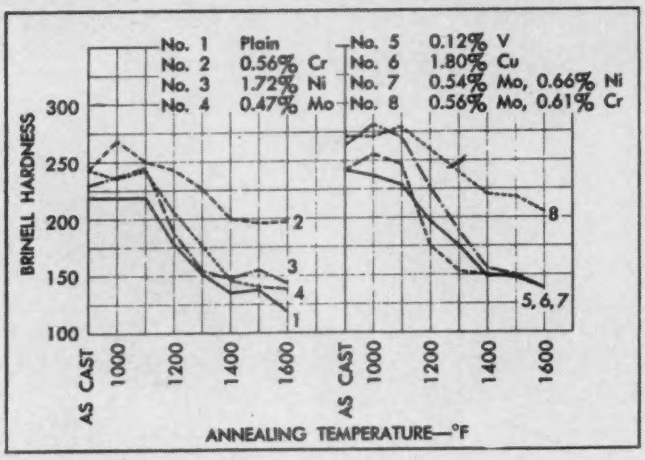
Molding Operations—The semi-automatic molding machines operate in pairs on copes and drags. To each molding machine corresponds a group of three roller conveyors. The two outer ones accommodate the finished molds, while the middle one returns the empty flasks (Fig. 11). The molds are poured from ladles of 900 lb capacity which travel on suspended tracks that run parallel to the roller conveyors. With these pouring devices one man can easily pour the molds (Fig. 12).

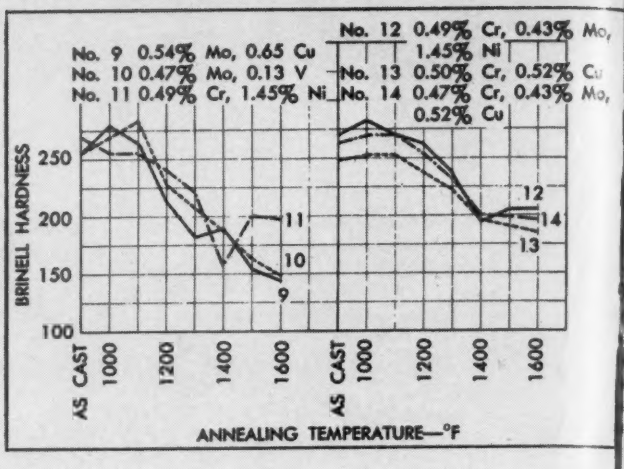
After cooling on the roller conveyor the molds are placed on the shakeout. The sand falls through the vibrating grids onto the above-mentioned conveyor belt for shakeout sand, while the castings are sorted into wagons and sent to the cleaning department. Above each molding machine is a hopper for facing sand and one for backing sand. They are fed alternately by the same supply belts. Overflow sand falls through a grid that surrounds each machine on three sides onto a conveyor belt, which returns it to the sand preparation department.

Larger molds are dried in oil or coke heated drying ovens, while two electric ovens are used for baking oil cores. Pit molds, on the other hand, are dried with portable blowers. These units are equipped with controlled electrically heated air. The hot air is blown into the molds under pressure so that even the deepest and least accessible parts of the mold are perfectly dried. Drying time is reduced considerably by using a large volume of air. The large cores are set into the molds and dried together at the same time. Since only clean hot air is blown into the molds, completely finished pit and flask molds now can be dried, redried or preheated before pouring.

Cleaning Department—Small castings are cleaned by airless blast cleaning machines. In the cleaning shop all the machines are linked with a dust removing plant. Large and medium-sized castings are cleaned in a high-pressure water blast unit which is equipped with a revolving table. The water jet for cleaning has a pressure of 1500 psi. Sand can be added to the water jet for the purpose of knocking out even the hardest agglomerations of sand. For core parts that are not easily accessible there is a second, smaller nozzle, which is manipulated inside the cleaning compartment.

The sand washed out of the castings flows through holes in the floor to a vibrating screen, where the coarse parts are removed, and from there to a mud tank located in the cellar. It is then pumped to the classification tank where the larger grains for adding to the cleaning water jet are removed. Most of the wet sand is conveyed to a washing plant where mud, dust and small sand grains are washed out. The clean sand is then centrifuged in a continuous Escher Wyss push type centrifuge with a capacity of 40 cu ft of sand per hour, until its water content is reduced to 3 per cent, and returned to the sand preparation department for reuse.





Figs. 14A, 14B—Effect on brinell hardness of annealing several alloy gray irons at various temperatures. Effect is least on irons containing chromium

Annealing or Softening

Improves Gray Iron Machinability

This is the second of two articles comprising part of the Gray Iron Founders' Society's forthcoming manual on gray iron heat treatment

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INFORMATION concerning the effect of alloys on the annealing of gray iron is not as complete as might be wished. However, a few general statements can be made. Certain elements, such as carbon and silicon, will accelerate pearlite and massive carbide decomposition at annealing temperatures; therefore, where these elements are present in sufficient percentage, the time at annealing temperature may be reduced.

Sylvester, for example, shows the time of decomposition of pearlite at various temperatures for two irons containing 1.93 per cent and 2.68 per cent of silicon, respectively[11]. In every case the pearlite in the higher silicon iron broke down more rapidly than in the lower silicon iron, and the temperature range over which effective annealing could be conducted was greater for the iron containing the higher percentage of silicon. At an annealing temperature of 1382°F (750°C), for example, complete pearlite breakdown in the high-silicon iron occurred in ten minutes, while 45 minutes was required for the breakdown in the lower silicon iron.

On the other hand, certain elements tend to stabilize the combined carbon and thus retard the rate of pearlite decomposition. These elements include chromium, vanadium, molybdenum, manganese and sulphur, when the latter exists in excess of the percentage usually found in gray iron[3]. Of these elements, chromium is the most effective carbide stabilizer.

Figs. 14A and 14B show the hardness change for gray irons of the same base composition and different percentages of alloying elements[12]. In this case, a range of annealing temperatures from 1000 to 1600°F was used. (The fact that further softening is seen to take place above 1400°F does not contradict the fact that 1400°F is usually the best annealing temperature in ordinary practice, since in this particular case unusually slow cooling rates were employed, so that the higher temperature anneals must be considered as superimposed on the 1400°F anneal. When, as was the case in Fig. 9, December FOUNDRY, the casting is air-cooled from the annealing temperature, the hardness will decrease very little or not at all after

TABLE I—Decreasing Hardness After Annealing at 1400°F

Tensile Strength After Annealing, psi	Tensile Strength As Cast, psi	Alloy Addition to Base, % Cr	Mo	Cu	Ni	V
44,500	46,200	0.61	0.56	....	....	....
43,100	50,600	0.47	0.43	0.52	....	....
40,000	41,700	0.56	....	....	....	....
38,200	43,000	0.50	....	0.52	....	....
42,600	55,500	0.49	0.43	....	1.45	....
37,400	52,400	....	0.54	0.65	....	....
40,000	48,400	....	0.47	....	....	0.13
34,800	45,400	0.49	....	....	1.45	....
33,000	50,000	....	0.54	....	0.66	....
31,200	41,000	....	....	....	....	0.12
29,900	41,700	....	....	....	1.72	....
31,600	44,000	....	0.47	....	....	....
29,900	43,500	....	....	1.80	....	....
27,700	37,400	....	....	....	....	....

treatments above the critical range.) It will be seen in Figs. 14A and 14B that the least change in hardness occurred in those irons containing chromium.

Table I lists the irons in order of decreasing brinell hardness after annealing at 1400°F. It should be noted that although chromium prevents maximum softening it does, of course, possess an important place in gray iron applications where strength and wear resistance must be maintained under severe working and temperature conditions.

Special anneals must be developed for cast iron of unusual analyses. For example, one foundry regularly anneals a 27-29 per cent high-chromium cast iron pump impeller casting at 1475°F, attaining a brinell hardness of about 300; the casting is then machined, and again heated, this time to 1800°F, and quenched with forced air. A hardness of 650 to 700 brinell results. Thus, by a double heat treatment a machined casting can be produced which is resistant to the most severe abrasive conditions[13]. Similar double heat treatments can be applied with equal success to plain and low-alloy gray irons.

Machinability—The annealing process is applied to gray iron almost exclusively as a means for promoting machinability. Its extraordinary effectiveness in this regard is illustrated in Fig. 15. It remains to point out briefly exactly what machinability means in the case of gray iron, and to demonstrate the importance of annealing the material as a method for improving machinability.

The property of a material referred to by the term "machinability" is complex, and consists of a number of factors which are only to a certain extent interdependent[14]. Without question, however, the factor of principal importance is tool life, i.e., the length of time a cutting tool will stand up under certain standard conditions of speed, feed and depth of cut. Another factor is power requirements; of the amount of power necessary to remove a given amount of metal can be reduced, less costly machine tools may be employed for machining operations. In the case of gray iron, annealing greatly improves machinability as judged by either of these standards.

This improvement in machinability is illustrated by the curves in Fig. 15 which show the total volume of metal that can be removed at given cutting speeds before the wear on the carbide milling cutter exceeds a "wear land" of 0.030 in. The upper curve marked "ferrite-graphite" represents a completely annealed iron, and it is evident that annealing is far more effective in increasing machinability than the alteration from fine to coarse pearlite in the as-cast structure of gray iron brought about by changes in chemical composition or casting section. The machinability of the completely annealed iron was found to be *fifty times as great as that of unannealed* gray iron at a cutting speed of 300 feet per minute, and eight times as great at a cutting speed of 1100 feet per minute[1]. In addition, the power requirement was reduced to one-half to two-thirds of that required before annealing[15].

The desired ferrite-graphite structure is preferably brought about by the low temperature ferritizing, or

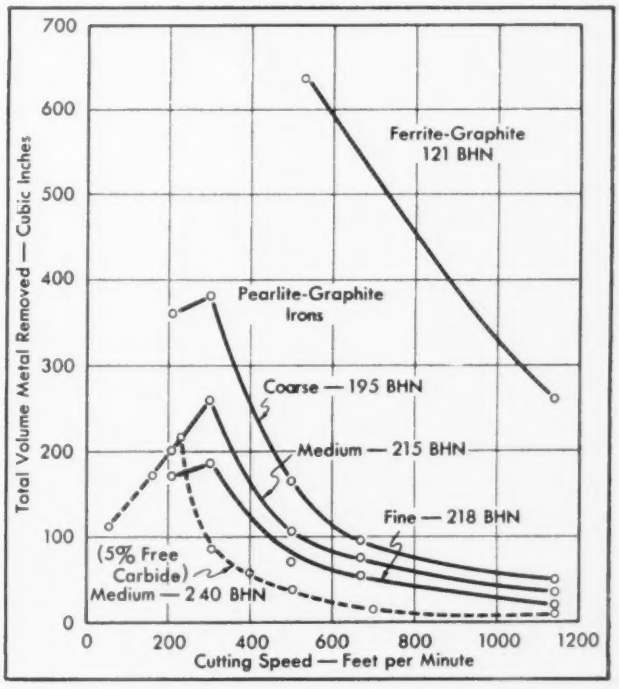

Fig. 15—Effect of iron hardness on machinability

TABLE II—Recommended Annealing Treatments for Gray Iron

Process	Use	Temp.	Time	Recommended Cooling Rate
Low-Temperature Anneal—(Breakdown of pearlite to ferrite and graphite for maximum machinability)	Plain and low-alloy irons	1300 to 1400° F	45 min to 1 hr per inch of cross section	Furnace cool 100° per hour between 1000 and 550° F
Medium Anneal—(Breakdown of pearlite to ferrite and graphite for maximum machinability)	Alloy irons and those not responsive to above low-temperature anneal	1450 to 1650° F	About 45 min per inch of cross section	Furnace cool from annealing temperature to 550° F
High-Temperature Anneal—(Elimination of massive carbides in mottled or chilled areas)	Retaining maximum strength and hardness	1650 to 1750° F	1 to 3 hr plus 1 hr per inch of section size*	Air cool to 1000° F, then furnace cool to 550° F
	For maximum machinability	1650 to 1750° F	1 to 3 hr plus 1 hr per inch of section size*	Furnace cool from annealing temperature to 550° F

*Carbides may often be eliminated in shorter times.

in special cases by a medium of anneal (curves B, B_1 respectively in Fig. 7, December FOUNDRY). It is evident that many high-speed machining operations exist where the advantages of maximum machinability far outweigh the moderate expenditure for annealing. For example, on one job involving the machining of 2000 castings per day, a saving of $1500 a week on cutter grinding was effected by the introduction of an annealing process corresponding to curve B in Fig. 7.

A dotted curve has been included in Fig. 15 to illustrate the effect on tool life of free carbide or free cementite in the structure of a "medium" pearlite gray iron. Such free carbide—carbide in excess of that required to form pearlite—can result from too low a content of graphitizing elements such as carbon or silicon, the presence of carbide-stabilizing elements, or too rapid a cooling rate brought about by chilling or casting in a very thin section.

From Fig. 15 it can be seen that up to a cutting speed of 250 feet per minute the presence of 5 per cent free carbide in the structure does not appreciably lower machinability as compared to as-cast "fine" or "medium" pearlitic irons. However, definite sacrifice in machinability is evident at higher speeds and of course this would be further magnified by higher percentages of free carbide. It will be recalled this free carbide, such as can occur in chilled areas, cannot be eliminated at subcritical temperature but requires the use of high-temperature anneal (Curve "C" in Fig. 7).

In the case of surface finish annealing, the third of the properties which are normally included in the term "machinability" has, unfortunately, a somewhat deleterious effect[15]. The best type of gray iron as regards ability to take an extremely smooth, bright finish is one with a fine pearlitic matrix and a relatively small percentage of finely divided graphite—the least machinable type of gray iron as far as tool life and power requirements are concerned (see Fig. 15). In applications where ability to take a fine finish is of primary importance, therefore, it is not advisable to anneal the casting completely.

However, where an unusually smooth surface finish is not a requirement, and where reduction in hardness and strength can be allowed, it is evident that, in many high-speed machining operations, the savings in time, tool-replacement and power far outweigh the cost of an annealing process. It is remarkable that up to now this unique response of gray iron to annealing has not been fully utilized.

Other Properties—A gray iron consisting entirely of ferrite and graphite differs somewhat in physical properties from a pearlitic iron. Some of these changes brought about by annealing may be harmful in certain critical applications, and in any case the heat treater should realize that the annealed casting differs from the same casting before annealing.

Tensile strength may be reduced 10 to 30 per cent using the anneals designed to eliminate pearlite[6]. Hardness may also be reduced from 30 to 150 brinell points by conversion of its pearlite to ferrite plus graphite[8]. This reduction in hardness is, of course, very valuable as far as machinability is concerned, but may be accompanied by a corresponding decrease in the types of wear resistance that depend on surface hardness.

Some oxidation of the surface, or scaling, may take place at the temperatures employed for the high-temperature anneal, unless a controlled-atmosphere furnace is used[9]. Furthermore, too rapid rates of heating to or cooling from the annealing temperature can cause distortion in the casting, especially in the case of the high-temperature anneal. Both of these considerations indicate the advantage of using the lowest possible annealing temperature.

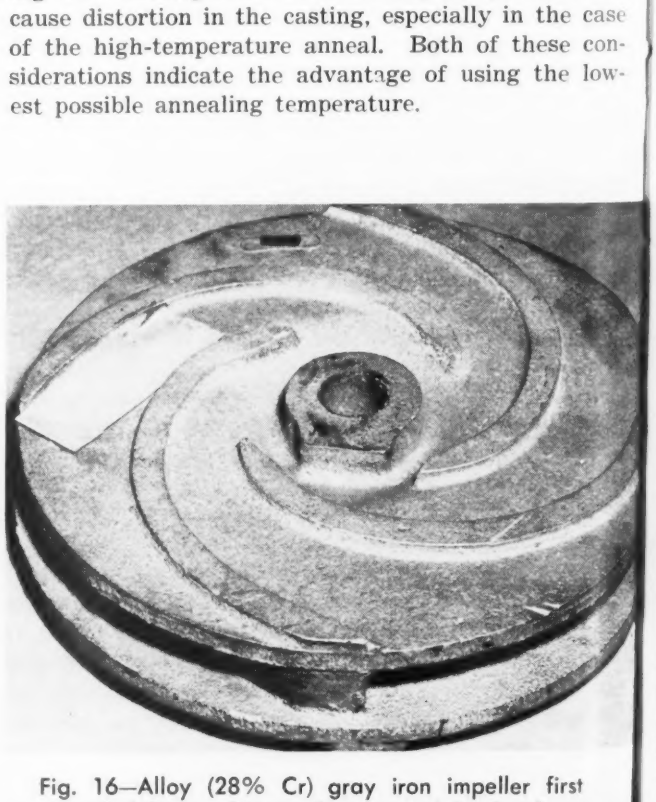

Fig. 16—Alloy (28% Cr) gray iron impeller first annealed for machining, then treated for hardness

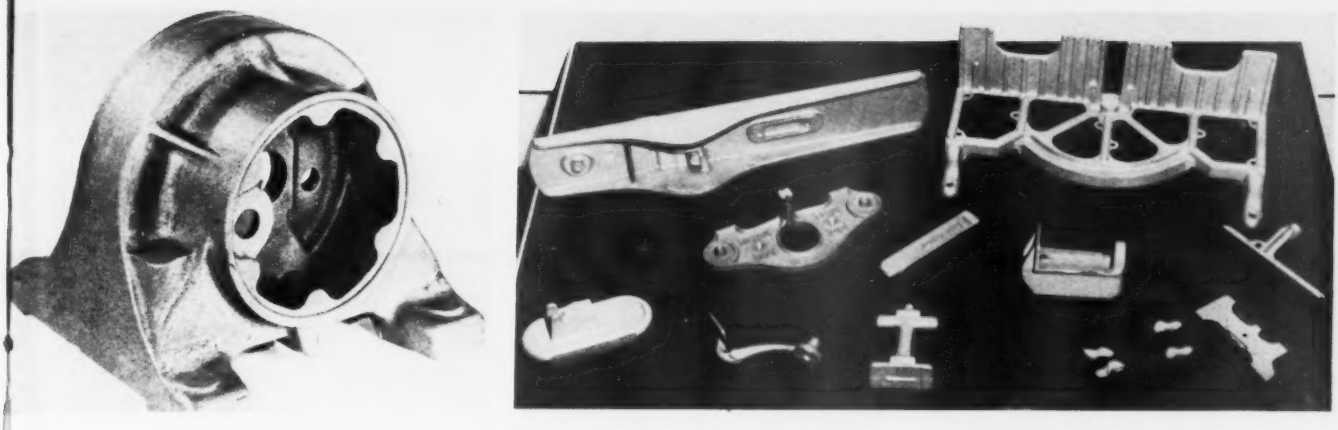

Fig. 17—Gear case (left) and typical castings annealed for better machinability

On the credit side, the softer annealed irons have, in addition to their greatly increased machinability, an increased impact resistance or toughness. There is also a certain increase in damping capacity, thermal conductivity, dimensional stability, electrical conductivity and related electrical properties[5]. It has also been found advantageous to anneal gray iron before enameling.

It may be seen that annealing affects many of the physical properties of gray iron. The effect of this change in properties should be taken into consideration before an annealing process is set up. In many instances a producer may desire to improve machinability without reducing the strength to the comparatively low level found in a pure ferrite-graphite gray iron. In this case, a partial anneal may be employed, involving the breakdown of only part of the pearlite and the spheroidization of the remainder. This partial anneal is frequently employed in the case of gray irons to which alloying elements have been added to improve strength and wear resistance.

Although the usual machinability anneal is designed to reduce hardness to as low as 105-120 brinell, in special cases, such as the pump impeller casting shown in Fig. 16, 300 brinell was considered a machinable hardness level. In addition, many low-alloy irons, particularly if they contain appreciable amounts of carbide-stabilizing elements such as chromium, resemble steels, and their hardness cannot be reduced below 150-200 brinell with any type of anneal (see irons 2 and 8 in Fig. 14A).

Applications—The use of annealing for improving the machinability of gray iron is gradually spreading. A recent survey on heat treatment conducted by the Gray Iron Founders' Society showed that 66 of the 102 foundries which reported that they used some kind of heat treatment, regularly annealed certain of their castings for machinability. It should be noted, however, that only about one-fourth of the foundries contacted used heat treatment in any form.

Annealing is at present most commonly applied to castings used by the automotive industry which are subjected to highly mechanized, high-speed machining operations. However, many other types of castings are being annealed, and the field for further expansion of the process is broad.

Some examples of castings which are regularly being annealed for machinability are as follows:[16]

Air-conditioning machine parts, bushings, cylinder blocks and heads, diesel parts, electrical controlling device parts, electrical machine parts, electrical meter castings, gas burner parts, glass mold parts, hardware, lawn-mower parts, machine tool parts, manifolds, pipe, pipe fittings, pulleys, pump housings, pump parts, refrigerator parts, sewing machine parts, textile machine parts, valve guides and seats, and washing machine parts.

Conclusion—Annealed gray iron is the most machinable of any ferrous product. The relatively great effect of annealing on improving machinability has been shown to be due to the unique presence of flake graphite in gray iron which speeds ferritization. The more general use of annealing and consequent expansion of the above list will increase the usefulness of gray iron castings to industry in many fields. The purpose of this section is to alert both producers and users as to the possibilities in this direction.

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QUESTIONS

Loses castings from shrinkage defect
Designing shell mold
Keeping risers fluid
Troubled by chilling
Wrong calcium compound

Shrinkage Develops Suddenly

QUESTION We are using in our cupola in India a mixture of 50 per cent pig iron, 30 per cent cast iron scrap and 20 per cent steel scrap, and sometimes suddenly find that the castings from the whole heat show a shrinkage defect. Will you let us know why shrinkage occurs all of a sudden in the same casting which was poured for days with the same metal?

ANSWER We suspect that a change has taken place somewhere; just what we are not in a position to determine. It might be that the metal temperature was low to permit satisfactory feeding with the particular gating system employed. Again, it might be that the molds were not rammed properly, permitting the casting cavity to enlarge under the pressure of the metal—resulting in what is known as a "swell."

Making Tappets in Shell Mold

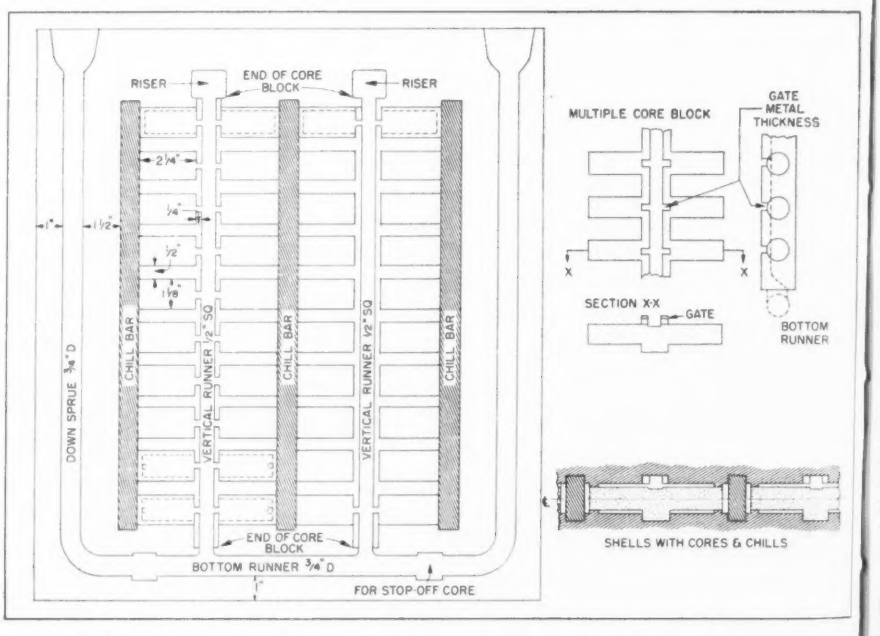
QUESTION We are making cast iron valve tappets in green sand, and the thought occurs that these castings might be a natural for shell molding. We are producing 40 in a flask. Cores have to be set with a special jig or fixture to insure proper location, and considerable time is required to load the jig. Have you any suggestion as to feasibility of shell molding for these castings, and also would it be possible to use one pattern for making both half molds?

ANSWER While it appears that production of valve tappets by the shell molding process is a logical procedure from the molding viewpoint, it may be something else again as to whether it is an economical proposition. As far as molding procedure or pattern arrangement is concerned several possibilities using a single pattern appear feasible. One of those is indicated in the accompanying sketch, but variations of it can be made as described later. As may be observed, the pattern will produce 40 castings.

To eliminate setting of numerous cores, it is suggested that a "block core" comprising 20 cores and incorporating the metal channel of runner and gates be blown in the form shown at the upper right. With that arrangement only two cores would have to be set, and the accommodating channels or grooves in the shell mold are such that the cores would be located exactly without difficulty. A variation would be to make a "block" of ten cores by a horizontal split if it is desired to cut down the size of the corebox.

Arrangement is for vertical pouring with the requirement of setting only three chill bars. With that arrangement two sprues, one on each side of the pattern, are needed so that the shells can be paired off and joined together. Since only one sprue will be used in pouring, provision is made for insertion of a stop-off core in the bottom runner on one side or the other depending upon which sprue is used in pouring. If the stop-off core is forgotten, the only loss will be that of the metal going to fill up the second sprue, and if the stop-off core is placed on the wrong side, the mold still can be filled from the other sprue.

Examination of the sketch makes it obvious that by using four chill bars, a single sprue placed in the center could be employed with two gates of 20 castings each on either side. Again the arrangement could



Suggested arrangement for producing cast iron valve tappets by the shell molding process using a single pattern to make both shells for the mold

? ANSWERS

be used for horizontal pouring by placing the sprue over the center of the indicated "bottom runner".

Objection to the latter is the presence of the sprue cavity on the underside which would have to be filled with metal. However, it probably could be stopped off with a core. Also the sprue projection on alternate shells could be eliminated by use of a detachable sprue on the pattern; but that would require some study of an easy operable method of attachment and detachment which in one case would not interfere with stripping the shell, and in the other of holding the sprue on the pattern during the stripping operation.

Material Aids Shrink Problem

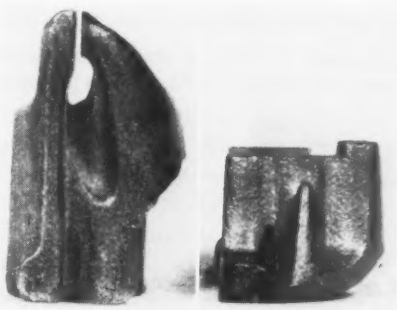
QUESTION Shrink holes in iron and steel castings are one of the most serious defects in castings. We in Austria have some compounds to help minimize these defects, but we never could eliminate them. We assume that there are firms in the States manufacturing compounds for eliminating shrink holes, and will appreciate some names and addresses.

ANSWER While we have in this country a number of materials of carbonaceous and non-carbonaceous base which may or may not provide exothermic reaction, depending upon composition, they will not eliminate shrink holes directly. However, they do operate indirectly by decreasing the rate of cooling of risers or feeders, and thus aid feeding or supplying molten metal to the casting to ameliorate the shrinkage problem.

In many cases the "riser compounds," as they are called, are employed to reduce the amount of metal required in the riser or head due to the fact that the metal stays liquid so much longer that less is required. There are a number of firms which can supply suitable materials, and their names and addresses may be found in the advertising pages of FOUNDRY.

Thin Portion Tends To Chill

QUESTION We are sending for your consideration a small iron casting used on a textile machine with which we are having difficulty in that the thin-section portion or tip is subject to chilling. A thin slot is cut through this with a 1/32-in. slitting saw, and chilling causes trouble. On the average about one out of ten of these castings will chill at the tip and be unmachinable. At present we anneal these, but still have some trouble. Annealing is undesirable since good wearing qualities are needed and the part is subject to considerable abrasion.



Sawing of slot requires machinable iron in lighter section of casting

Castings are made in sand of 150 AFS fineness with a permeability of 40, green compression strength of 10 psi, and 3 per cent moisture. Iron is melted in an electric induction furnace and poured at 2900° F. Metal composition attempted is 3.40 per cent TC, 2.40 per cent Si, 0.90 per cent Mn, 0.20 per cent P, and 0.030 per cent S. Si is run purposely low and is raised by late inoculation of about 0.2 per cent of ferrosilicon and silicon-manganese-zirconium.

ANSWER Assuming that the composition given for the castings is held within reasonable limits and that the same applies to the sand, one must look for other causes of the chilled tips. While it is quite possible that all the chilled tips may result from iron taken from one ladle which is not dried out thoroughly, we suspect that the difficulty might be caused by the high pouring temperature employed. Investigations indicate that at high melting temperatures the chemical and physical reactions involved differ from those at lower temperatures; the tendency of the former is to promote chilling.

Two procedures are available to determine whether or not the high temperature pouring is responsible. First and simpler is the reduction of the pouring temperature to 2670° F above which, according to Heine and Lange (*Transactions*, AFS, 1951), a pronounced change in chilling tendency occurs under oxidizing melting conditions. If you feel that you must maintain the high pouring temperature, then try the addition of 0.2 per cent Al.

Used Wrong Calcium Compound

QUESTION We operate a foundry in Italy and were greatly interested in Harold J. Roast's "Tin and Leaded-Tin Bronze" discussion in the July, 1953 issue of FOUNDRY since it might be an answer to one of our problems. We tried casting a number of test pieces of high-conductivity copper following the procedures outlined, but results were strikingly discouraging. Since the suggested procedure was followed carefully, we concluded that something was lacking in it or the calcium boride used was different from that mentioned. While the author mentions "black calcium boride," the only material we could find was white calcium boride.

ANSWER Evidently the white material which was represented to you as calcium boride is some

other calcium compound. Calcium boride is in the form of black cubic crystals with the formula CaB_6.

Communication with the author of the article confirmed that the practice as described, using black calcium boride, still is employed regularly for production in a foundry with which he long was associated. Black calcium boride may be obtained from several producers whose names and addresses may be found in the advertising section of FOUNDRY.

Tellurium Stabilizes Carbide

QUESTION We would appreciate receiving some information on use of tellurium as a chill. Only thing we have is very sketchy, consisting of a paragraph or two, and would like to have data which are of a theoretical nature and practical value. Also if you have any knowledge concerning the iron-tellurium constitution diagram or know where we can find the same we would appreciate learning of such.

ANSWER As you undoubtedly know, tellurium is employed in two ways to provide chilled iron. One is to add the material directly in the ladle of molten iron with or without addition of graphite, and the other is to apply it in the form of a paste or wash on the mold or core surface.

First method gives an over-all chill effect while the other method confines the chill to a given area. Tellurium is a potent carbide stabilizer, and only small amounts are needed. For example, 0.005 per cent Te (1.6 oz per ton) added to the ladle will give a ⅜-in. chill in car wheel iron. Material is available in powder, pellet and stick form as well as a Te-Cu alloy containing 50 per cent Te.

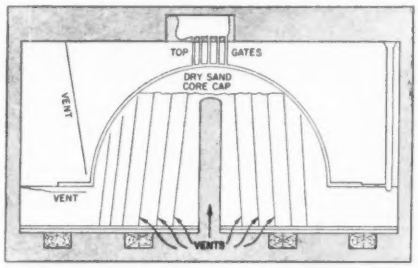
Articles on application of tellurium in gray iron include: "Use of Tellurium in Promoting Chills on Gray Iron Castings" by C. R. Austin in the July, 1949 issue of FOUNDRY, and "Tellurium Core Washes" by J. O. Vadeboncoeur in *Transactions*, American Society for Metals, 1945. We do not know of any Fe-Te constitution diagram. Austin in his article mentions that large amounts of Te form iron telluride, but in the small quantity employed for chilling, metallographic evidence is lacking.

Inside of the Pot Is Scabby

QUESTION Recently we cast a round-bottom pot 32-in. diam, 18-in. deep with a 6-in. flange around the top edge. The pattern was molded bottom up to leave its own core sitting on the drag. When shaken out the inside surface of the pot was covered with scabs. What procedure is necessary to produce a clean, smooth surface inside and outside the casting?

ANSWER If this is your first experience with a pot casting, it is quite probable that the scabby interior was caused by hard ramming, inadequate venting in the mound of green sand, or a combination of both. Several other items may be involved. We shall touch upon them later.

In regular practice the pattern, mouth up, is placed in a light follow board frame or, in an emergency, a false cope. The first two



Adequate venting is the most important feature in molding pot casting

6-in. courses of sand are not rammed with a rammer. The sand is *tramped off* with the feet. The final course is butted lightly to prevent the sand in this area from yielding when the mold is filled with metal. A yielding mold increases the weight of the casting.

The drag flask is adjusted in place, filled with sand, scraped off, the bottom board is put on and rubbed down to a bearing. The board is removed temporarily and a good, stout vent wire, ¼-in. diam is employed to thoroughly vent the mound of sand inside the pattern. Generous channels are cut in the sand between the drag and the bottom board. In certain instances it may be advisable to place a 6-in. plug in the center and remove it before final adjustment of the bottom board. Remainder of the method, clamping and rolling over, ramming and lifting the cope is ordinary routine.

Depending on the character of the sand, the casting may be gated through a wedge gate, or through several pencil gates on the top, or through a long sprue and three or four ordinary flat gates into the flange at the bottom of the mold. Bottom gates are fairly safe with nearly any kind of sand. Top gates cannot, or rather should not be employed where the sand is weak. Weak sand will wash under the impact of the flowing metal stream.

In some instances of this kind where top gating is desirable, the foundryman has reinforced the green sand mound by placing a dry sand core on top. The dry sand core is formed by ramming a 3 or 4-in. thickness of core sand in the pattern. The core is turned out on a plate and dried in the oven. The dried cap core is placed in the pattern and the remaining space in the pattern is filled with green sand. Sand must be rammed firmly in the drag under the flange and in the cope over the flange. Sand in these areas, unless extremely permeable, should be vented with a wire to prevent the metal from *kicking*. Any turbulence while the metal is filling the mold will show up on top of the casting in the form of scabs and blow holes.

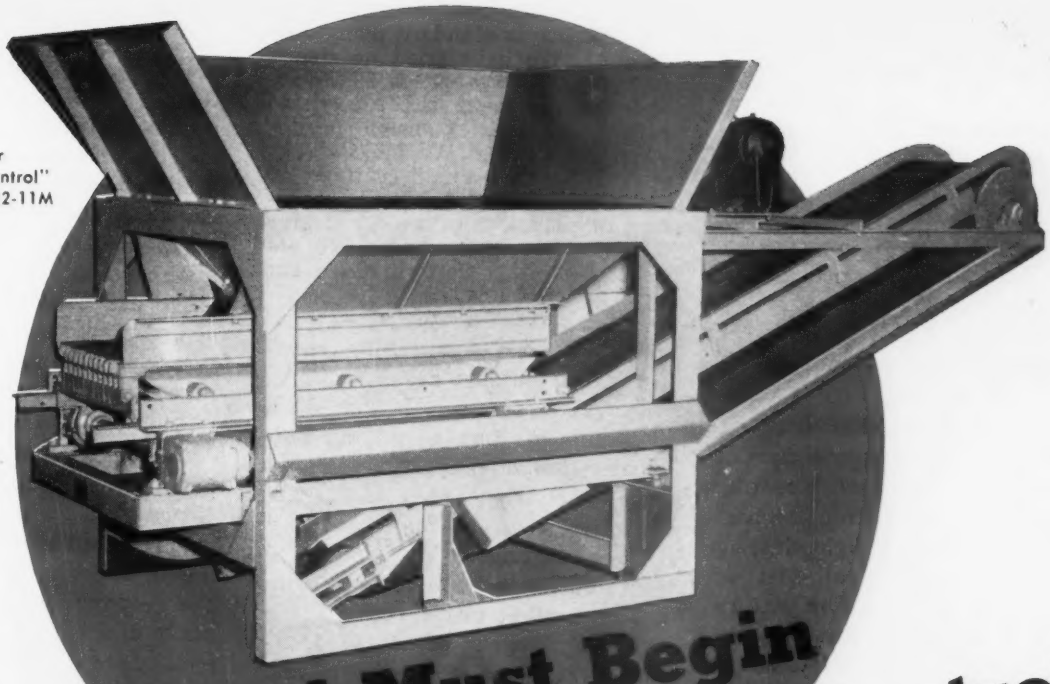
Be sure to touch off the vent under the bottom board. If the gas is allowed to fill the hole left by the plug in the center it will form an explosive mixture and blow part or all the top off the core.

Tablet Molds Are Skin Dried

QUESTION We are having some trouble with rough spots on the face of tablets poured in green sand from an 85-5-5-5 bronze mixture. If it is necessary to dry the molds, please outline the procedure and the materials employed.

ANSWER Many small bronze tablets are cast successfully in green sand molds. The greatest care is required in preparing and ramming the sand. If the sand is too dry, it will wash under the flowing metal. If it is too wet or too hard, the steam will lift particles off the face, particularly the small projecting bodies of sand in the letters. If the sand is rammed too soft, the casting will swell in the mold and exceed the required thickness. Due

(*Concluded on page* 118)



Royer
"Scrap Control"
Model S-522-11M

Sand Control Must Begin With "Scrap Control"

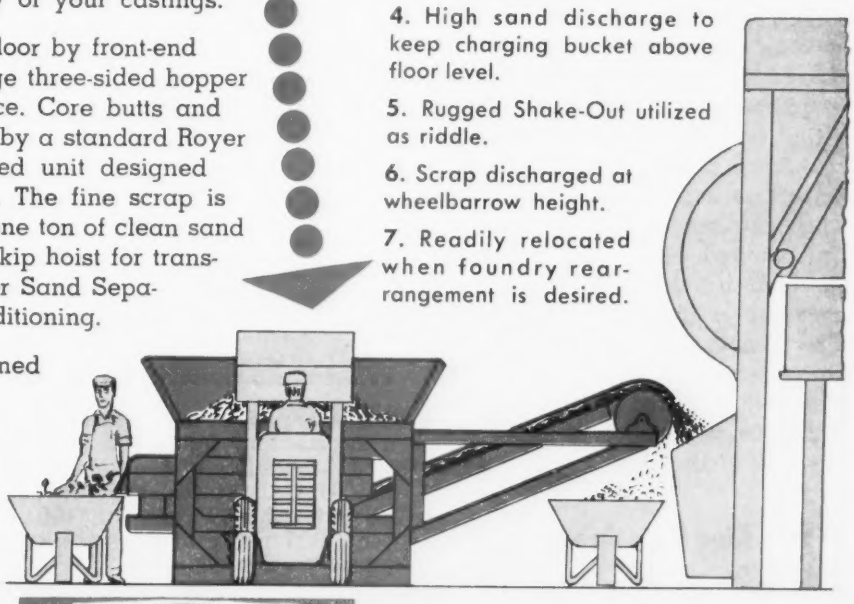
Now foundries of relatively small production volume can have fully mechanized "scrap control" as part of their centralized sand preparation systems. Here is a compact, easy-to-install sand cleaning unit that will return many, many times your investment in reduced labor costs and the greatly improved quality of your castings.

Sand scooped from the molding floor by front-end loaders is dumped into the large three-sided hopper that provides ample storage space. Core butts and large scrap are then riddled out by a standard Royer Shake-Out, a ruggedly constructed unit designed to withstand punishing service. The fine scrap is removed by a *magnetic pulley* as one ton of clean sand per minute is discharged into a skip hoist for transmission to a muller or a Royer Sand Separator & Blender for complete conditioning.

Send us your inquiry and a trained foundry engineer will be glad to furnish you with complete details on this new unit in the Royer line.

7 BIG Advantages

1. Clean sand at 60 tons per hour.
2. No pits, no excavating. All equipment above floor level.
3. Low receiving hopper for front end loader feeding.
4. High sand discharge to keep charging bucket above floor level.
5. Rugged Shake-Out utilized as riddle.
6. Scrap discharged at wheelbarrow height.
7. Readily relocated when foundry rearrangement is desired.



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Chicago 6, Ill., U.S.A. Cable: ASMAN

Foremost in Sand ROYER *Conditioning Equipment*

ROYER FOUNDRY & MACHINE CO. 159 PRINGLE ST. KINGSTON, PA.

(*Concluded from page* 116)
to the limited thickness of medium size and large tablets the metal must be poured at a high temperature and at high speed.

To avoid all these hazards, foundrymen have developed the almost universal practice of skin drying the face of the mold. Any water-soluble binder will serve, but molasses water usually is employed as a spray before drying. The strength of the solution is about one part molasses to 20 parts water.

After the pattern has been removed from the drag, the face of the mold is covered with a coating of plumbago shaken through a bag. This is followed by a light dusting of lycopodium, charcoal dust or other drying medium. The pattern is replaced in the mold and rapped down all over. In stoveplate shops and other shops of a somewhat similar character this practice is known as *printing back*.

The pattern again is removed and the face of the mold is sprayed with the molasses water. Amount of spraying will depend on the thickness of skin desired to be dried. This will vary from $\frac{3}{8}$-in. on small tablets to $\frac{3}{4}$-in. on large tablets. On large tablet molds it is customary to incorporate a small amount of core binder in the facing sand, instead of depending entirely on the spraying process.

Any one of a number of methods may be employed to skin dry the face of the mold. A few bricks can be placed on the joint to support a thin steel sheet on which a charcoal fire is built. Actual experience is the only guide in determining when the sand has been dried to the required depth. Care must be observed to maintain a uniform heat over the entire face of the mold. Use of a gas or oil torch is more convenient and rapid, but experience is required to prevent the flame from burning or scorching the face of the mold.

Piston Ring Pots Are Porous

QUESTION We have been trying to make some piston ring pots which are sound throughout. These are 2 in. thick, 12 in. high and range from 10 to 90 in. OD. Customer specified analysis to show 3.70 TC, 2.72 Si, 0.045 S, 0.55 P, and 0.62 Mn. We have been trying the 40 and 42-in. OD sizes, but the upper third always shows porosity. Molding practice is standard using skin drying. We have tried no risers, with four equally spaced 4-in. diam risers, and raising the pattern to provide a 3-in. extension header without success. We believe that we can produce sound castings by reducing Si and TC, but the customer says that this would not give a good piston ring iron. We did get a reduction in P to 0.15, but that did not help.

ANSWER The composition specification given as a requirement by your customer indicates that he is thinking in terms of small-diameter, individually-cast, thin-section piston rings used in the automotive field rather than 2-in. section castings. We would expect that a Si content of 2.70 in a 2-in. section would result in an extremely "open" or coarse structure, which under deep cuts and high-feed machining rates would give the appearance of porosity by tearing out large graphite flakes. However, such condition would exist all over the machined surface rather than being confined to any specific area.

Therefore, we suspect that your sand may be somewhat on the "tight" side which permits a slight, but sufficient agitation of metal to occur. During the filling of the cavity the lower portion of the mold dries out sufficiently to allow the metal to settle quietly. One way to determine whether that is taking place is to leave the cope off the mold and watch the appearance of the iron as it rises in the cavity.

If you do not want to do that, try using the vent wire adequately round the inner and outer peripheries of the cavity about 2 in. from the faces.

What Is Reasonable Overhead?

QUESTION What is considered to be a satisfactory figure for overhead by the majority of the foundries in the United States and Canada? Should it be 50 per cent, 100 per cent, 200 per cent or some other figure?

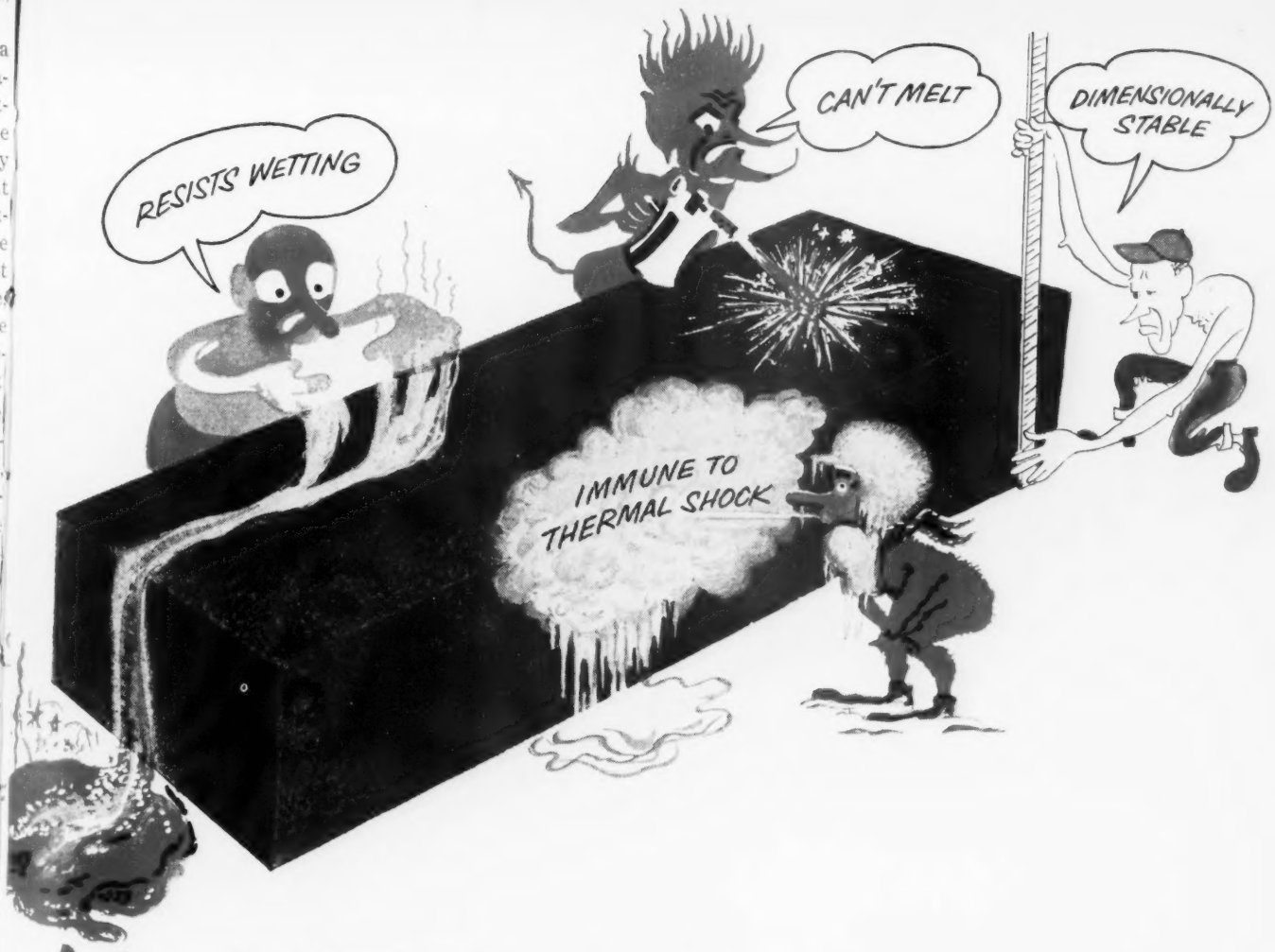
ANSWER As it is commonly used, the term overhead usually refers to a certain part of the cost of operation, including insurance, taxes, depreciation, upkeep, light, heat, power, office expense, advertising, welfare, public relations, pensions, etc.

Direct cost of operating a foundry covers cost of raw materials and wages paid for converting raw materials into a salable product. This direct cost readily is broken down into the component parts—melting, molding, coremaking, cleaning and shipping. The other expense referred to cannot be broken down readily. Therefore the items are included as a definite percentage of operating cost as determined by the total or direct cost.

Obviously, this overhead figure arrived at through extended experience, varies widely. For example, the overhead in a foundry employing a dozen men would not have the proportionate overhead expense of a foundry employing 1000 men. Also it is quite possible that the overhead in two shops with an equal number of men might differ to a considerable extent. There is no hard and fast rule to apply to all plants.

Since several different operations are necessary for the production of castings, an over-all percentage means nothing in consideration of overhead rates. We assume you refer to direct or productive labor as a base on which to apply the overhead. Overhead for the melting department is related to the pounds melted rather than to labor. Overhead for the coreroom is related to coremaking hours, not to the coremaker's wages. Core baking is related more to the number of heat units, than to the labor of loading and unloading the ovens.

Since some foundries are more highly mechanized than others and since there are few elements included in the overhead of the molding department directly related to molding labor, it is highly erroneous to apply overhead in that department on a direct labor basis. Other operations, such as tumbling, hand cleaning, converting, inspecting, packing, shipping, etc., should be treated, costwise, according to bases best adapted to each. Each foundry makes an analysis of the several overhead items and applies each item to producing operations on the basis that is recognized by competent cost engineers as sound practice. Anything short of that is of little value.



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TRADE-MARK

KEEP THESE STANDARD SIZES ON HAND FOR EMERGENCY!

13½" x 6" x 3" series
9" x 6" x 3" series
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If you think of carbon only in terms of complete furnace linings, check these other important locations in and around the furnace where "National" carbon brick and shapes will also save time and money as a maintenance refractory:

- ✓ **RUNOUT TROUGHS**
- ✓ **CINDER NOTCH LINERS**
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- ✓ **SPLASH PLATES**
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Men of Industry

RICHARD HEROLD has been appointed vice president-foundry sales, Taylor-Wharton Iron & Steel Co., with headquarters in High Bridge, N. J. Mr. Herold, a graduate of Yale University, for the past 7 years has been manager of foundry product sales, Borden Co., N. Y. **John P. Reynolds** has been named sales manager for the High Bridge plant and **Joseph A. Trainor,** sales consultant to the vice president of the company.

♦ ♦ ♦

Robert K. Beck, recently vice president and general manager, Apex Smelting Co., Chicago, has been elected president, succeeding **W. A. Singer,** who had held the office since the company was organized in 1923. Mr. Singer now is chairman of the board. All other officers and directors remain the same.

♦ ♦ ♦

Otto W. Winter, recently president, Winter Engineering Co., Buffalo, will head the new Shell Mold division established by Beardsley & Piper Division of Pettibone Mulliken Corp., Chicago. Mr. Winter, who has had extensive experience in designing shell mold equipment is a pioneer in the field. The new division will offer machinery and supplementary equipment as well as consultation service on shell molding problems.

♦ ♦ ♦

A. L. Foscue has been appointed president, Electro Metallurgical Co., and United States Vanadium Co., divisions of Union Carbide & Carbon Corp., New York, succeeding **Walter E. Remmers,** who has become chairman of the two divisions and is also a vice president of the parent company. Mr. Foscue has been a vice president of Electro Metallurgical since 1951. He joined that division in 1924 and worked in the Niagara Falls, N. Y., laboratories and plant, the Alloy, West Va., plant, and in 1946 was transferred to New York where he became works manager three years later.

♦ ♦ ♦

Edmund Q. Sylvester, formerly executive vice president, has been elected president, Griffin Wheel Co., subsidiary of American Steel Foundries, Chicago. **Herbert J. Rosen,** who has been president since 1948 and with the company 53 years, has become chairman of the executive committee. **John W. Brittingham,** formerly vice president-treasurer, has been named first vice president and **Cedric P. Voll** is now treasurer-controller.

♦ ♦ ♦

Charles Locke, for the past two years works manager, Atlas Foundry & Machine Co., Tacoma, Wash., is now works manager, West Michigan Steel Foundry Co., Muskegon, Mich. For ten years prior to 1948 he had been associated with the latter company, advancing to chief metallurgist and later to general superintendent. From 1948 to 1951 he was in the metals research department of Armour Research Foundation of Illinois Institute of Technology, Chicago. Mr. Locke is a graduate of Michigan College of Mining and Technology in metallurgy and has a master of science degree from Rensselaer Polytechnic Institute.

♦ ♦ ♦

Paul F. Paulsen, recently with Alloy Cast Steel Co., Marion, O., has been appointed superintendent, Saginaw Foundries Co., Saginaw, Mich. Mr. Paulsen's previous connections include American Manganese Steel Co., Chicago Heights, Ill., and Kensington Steel Co., Chicago.

♦ ♦ ♦

Francis J. Coates has been appointed sales manager, Misco Precision Casting Co., Whitehall, Mich. **William J. Flessner** has been put in charge of the industrial engineering department. **W. I. Dieters** recently

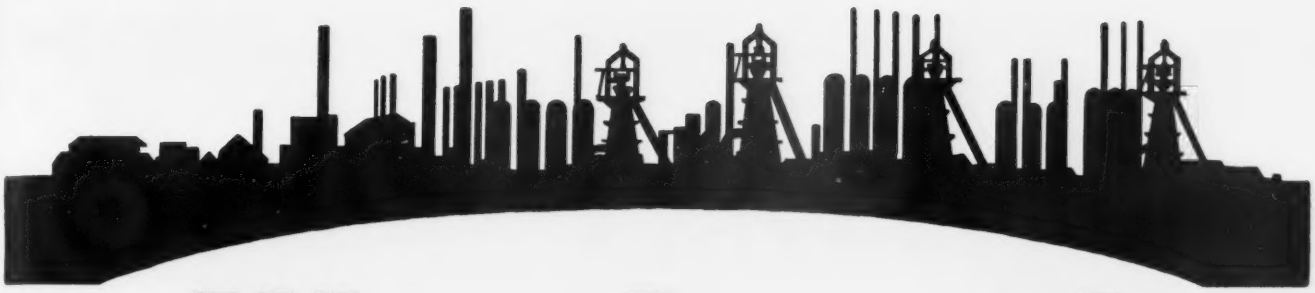
(*Continued on page* 122)

RICHARD HEROLD
. . . joins Taylor-Wharton

ROBERT K. BECK
. . . Apex Smelting president

OTTO W. WINTER
. . . heads shell mold division

A. L. FOSCUE
. . . heads Electro Met



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FRANK WATT
. . . F. B. Stevens sales mgr.

DURWOOD J. SWANINGER
. . . buffing department sales

DR. J. A. RIDDERHOF
. . . Stevens department head

(*Continued from page* 120)
joined the company as staff engineer, and **D. O. Ryan** as personnel director.

♦ ♦ ♦

Edward L. Bohn has been named vice president, Mullite Refractories Co., Shelton, Conn. Mr. Bohn joined the company last year following 15 years with Charles Taylor Sons Co., Cincinnati. Previously he was sales representative with North American Refractories, Cleveland.

♦ ♦ ♦

W. Donald Bryden, chairman of the Philadelphia Chapter of the American Foundrymen's Society for 1953-54, is president-treasurer, Philadelphia Bronze & Brass Corp., Philadelphia. Mr. Bryden was born in West Pittston, Pa., and was educated in the Philadelphia schools. He joined Philadelphia Bronze in 1927, supplementing his work as a production clerk there by attending evening courses at Drexel Institute. He became superintendent in 1937, works manager in 1941 and president in 1949.

Frank Watt has been named general sales manager for the metal finishing and foundry divisions, Frederic B. Stevens Inc., Detroit. He joined the company in 1934 as a sales engineer. **Guy Cummings** has succeeded Mr. Watt as sales manager of the metal finishing division. **Clair Crawford** has become sales manager for the foundry division. **Ralph L. Eastman** is now consultant on all metal finishing operations and **Durwood J. Swaninger** is sales manager of buffing compositions. **Dr. J. A. Ridderhof,** with the company 26 years, has been appointed manufacturing manager and director of research for the foundry facing and buffing composition departments.

♦ ♦ ♦

Harold O. Washburn, since 1945 president, American Hoist & Derrick Co., St. Paul, has become chairman of the board. Mr. Washburn joined the company in 1911 following graduation from University of Michigan, subsequently served as assistant secretary and treasurer and in 1934 became vice president-treasurer. **John E. Carroll,** recently vice president, has succeeded Mr. Washburn as president. A graduate of University of Minnesota, Mr. Carroll joined the company in 1937 as a salesman. Later he left to enter a partnership, heading its construction equipment division, and returned in 1949 as general sales manager. **James F. Bishop** has been named vice president-treasurer of the American Hoist & Derrick Co.

♦ ♦ ♦

Jerry Singleton has been appointed executive secretary, the Magnesium Association, with headquarters in the executive office at 122 East 42nd St., New York. Mr. Singleton has been executive secretary of the Advertising Typographers Association, New York, for 3 years.

♦ ♦ ♦

Paul C. McConnaughey has been appointed sales manager of the Gas and Coke Division, Koppers Co., Pittsburgh, in charge of sale and distribution of coke from the Kearny, N. J., and St. Paul plants as well as the Clifton, N. J., Newark, N. J., and

(*Continued on page* 124)

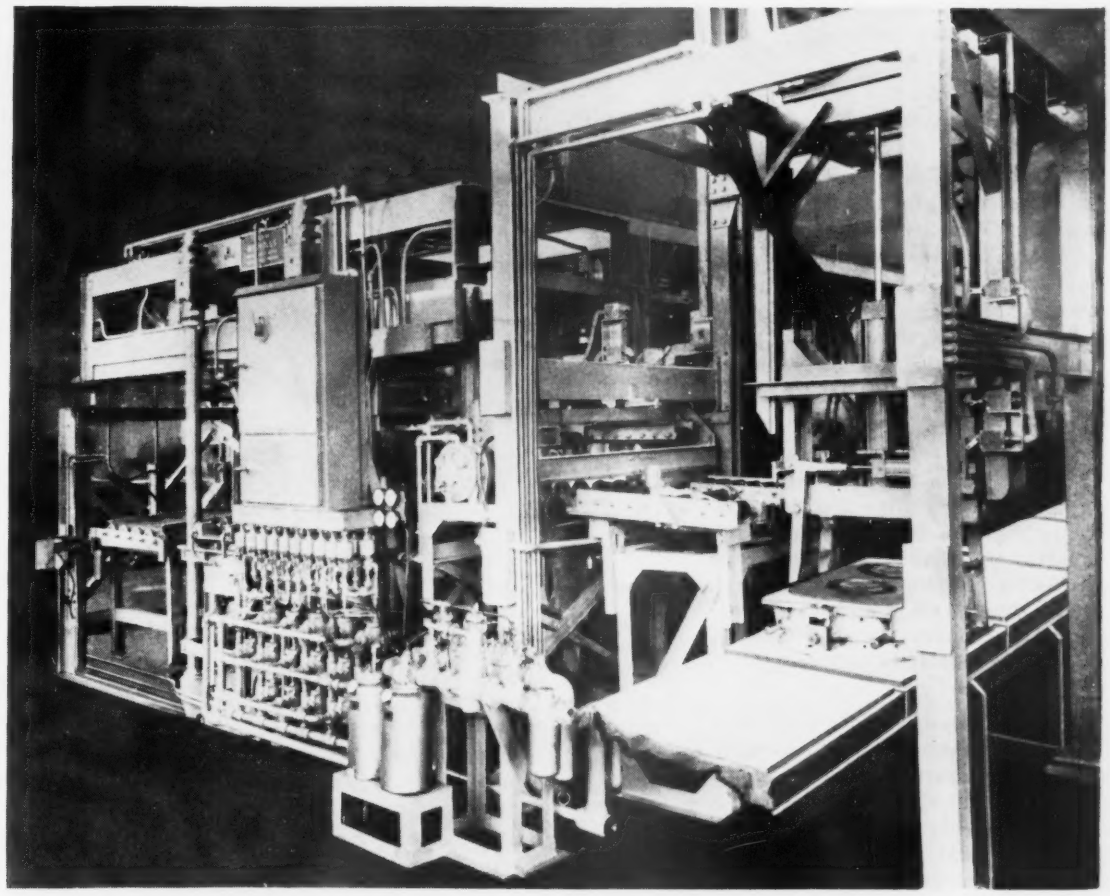
W. DONALD BRYDEN
. . . heads Philadelphia chapter

HAROLD O. WASHBURN
. . . American Hoist chairman

JOHN E. CARROLL
. . . American Hoist pres.

PAUL C. McCONNAUGHEY
. . . coke sales, Koppers Co.

"Push-Button" Automatic Operation Means The Ultimate in Increased Production... Economy... Quality Molds



After completed mold is turned over, it is automatically transferred to mold conveyor.

Every Nicholls Molding Machine is precision-built to insure the production of *continuously* better molds. They eliminate guesswork and costly mistakes, end dangerous risks. They effect major savings in materials and maintenance costs.

This improved #24 Type C Machine has a pneumatic pattern draw, is equipped with an air-operated car type squeeze head, built-in flask roll-in roll-out device and a measuring sand hopper. Other Nicholls' advantages include a flask indexing device and sand spill upset; flask feed-in elevator; mold turnover and transfer . . . PLUS exclusive Nicholls "push-button" fully automatic operation.

Always rely on "Nicholls" for the best in heavy-duty molding machines

Wm. H. Nicholls Co., Inc., Richmond Hill 18, Long Island, N. Y.

NICHOLLS

(*Continued from page* 122)

Brooklyn, N. Y., distribution yards. Mr. McConnaughey was graduated from Pennsylvania State College and joined the Seaboard Plant in Kearny, N. J., in 1929. Following 19 years of sales work he was division personnel manager for a year and has been assistant manager of the Seaboard Plant since 1949.

♦ ♦ ♦

A. T. Peters, for the past year assistant plant manager, has become plant manager, Bay City Division, Dow Chemical Co., Bay City, Mich. Mr. Peters was graduated from University of Wisconsin with a Master of Science degree in metallurgical engineering and joined Dow's metallurgical laboratories in 1940. In 1946 he became manager of casting processes there and in 1947 was named foundry superintendent of the Bay City Foundry.

♦ ♦ ♦

Fred N. Eaton has been appointed works manager of the foundry division, Aluminum Industries Inc., Cincinnati. Mr. Eaton was associated with Bohn Aluminum & Brass Corp., Detroit, for 25 years and was manager of its foundry division. He is a graduate of Michigan University.

♦ ♦ ♦

Otto V. Guenther, since 1946 head of the mechanical and metallurgical technology departments of the Erie County Technical Institute, Buffalo, has been appointed president of the Troy Technical Institute, which is also under supervision of the State University of New York. Mr. Guenther was graduated from Carnegie Institute of Technology, and from 1915 to 1926 was engaged as a draftsman at Worthington Pump & Machinery Co., Buffalo, and Carborundum Co., Niagara Falls, N. Y. He was instructor at Seneca Vocational High School, Buffalo, from 1926 to 1942, when he was appointed a supervisor in the Division of Vocational Rehabilitation, State Education Department of New York.

♦ ♦ ♦

David W. Harris, elected chairman of the Tri-State Chapter of the American Foundrymen's Society for 1953-54, recently has been sales engineer, Midwest Foundry Supply Co., Tulsa, Okla. Mr. Harris majored in industrial psychology at University of Tulsa, and received his foundry training under his father, the late Will Harris, who was superintendent of Tulsa Iron Works Co. Later he became foreman, Star Machine & Foundry Co., Amarillo, Tex., and following military service became foundry superintendent, Frank Wheatley Pump & Valve Co., Tulsa. Mr. Harris plans to join MacKay Foundry Co., Lufkin, Tex., in the near future.

DAVID W. HARRIS
. . . AFS chapter chairman

♦ ♦ ♦

Walter F. Schultz has been appointed Cleveland regional engineer, Lamson Corp., Syracuse, N. Y. to supervise engineering on the company's line of conveyors, pallet loaders and blowers. Mr. Schultz, who has been contract engineer in Syracuse, previously was associated with the New Departure Division foundry of General Motors Corp. in Anderson, Ind.

♦ ♦ ♦

Clinton R. Wyckoff Jr., president, Atlas Steel Casting Co., Buffalo, recently was honored by being presented with the Boys' Club of America medallion, symbolic of unusually devoted service to boys. It was the first such medallion given to anyone in the United States. Mr. Wyckoff is president of the Butler Mitchell Boys Club, is chairman of the Western New York-Northwestern Pennsylvania Area Council of Boys' Clubs of America and is a member of the National Board.

♦ ♦ ♦

Keith Williams and **L. J. Gallagher** have been elected vice presidents, Dayton Malleable Iron Co., Dayton, O. Mr. Williams is general manager of the company's Pratt & Letchworth Division, Buffalo, and Mr. Gallagher is general manager of the Ironton, O., plant. **Frank O. Parker,** vice president and sales manager, has been named a director.

♦ ♦ ♦

Seward E. Shaver has been appointed West coast district manager of foundry equipment sales, Sterling Wheelbarrow Co., Milwaukee, covering California, Oregon and Washington, with headquarters in Palo Alto, Calif. Mr. Shaver previously represented Archer-Daniels-Midland Co. in Wisconsin and Minnesota.

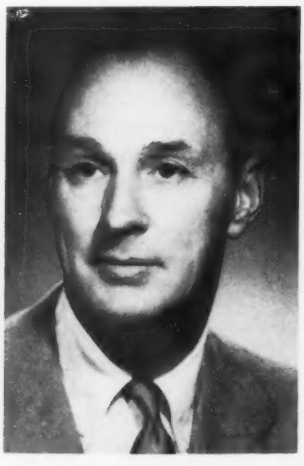
♦ ♦ ♦

Sydney E. Gregory has been named sales representative in Illinois and Indiana for Alloy Precision Castings Co., Cleveland. Mr. Gregory was

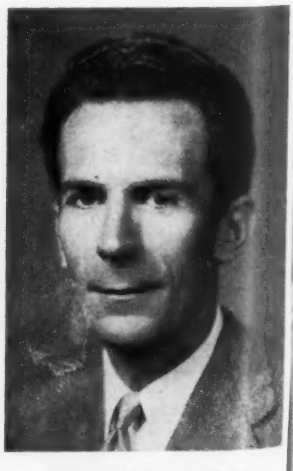
(*Concluded on page* 126)

OTTO V. GUENTHER
. . . heads Troy Institute

WALTER F. SCHULTZ
. . . Lamson sales, Cleveland

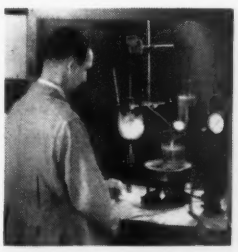


SEWARD E. SHAVER
. . . foundry equipment sales



SYDNEY E. GREGORY
. . . precision casting sales

THIS little fella's got a lot of the same problems that you do. He worries about green strength, baked strength, and even collapsibility—in a slightly different way. It doesn't bother him much now, but when he gets into *real* core making he'll need a core oil that will perform well no matter what the conditions. Then Pelron can step in and help by designing a custom core oil for the job—and save money too! Pelron's technical engineering service will help you get *the best core oil available.* Call your Pelron representative in today or write us for full details. Pelron Corporation, 7740 W. 47th St., Lyons, Illinois.



PELRON®

*Send for the new bulletin

(*Concluded from page* 124)

previously general manager of the permanent mold division, Barnes Mfg. Co., Mansfield, O.

♦ ♦ ♦

John F. Schnur, foundry technologist, Armour Research Foundation, Illinois Institute of Technology, recently returned to the United States after 20 months in India, where he demonstrated modern foundry techniques for the foundation's International Department. Mr. Schnur will return to India in February to establish a training center for foundrymen at the Indian Institute of Technology in Kharagpur, about 75 miles from Calcutta.

♦ ♦ ♦

E. H. Gross, previously manager of the bonding materials division, Bakelite Co., division of Union Carbide & Carbon Corp., New York, has been transferred to the market development department.

♦ ♦ ♦

M. L. Watson, since 1935 Chicago district manager, Palmer-Bee Co., Detroit, has been named sales manager for the company.

♦ ♦ ♦

Harold E. Collins, until recently sales manager of the Pigments Division, Metals Disintegrating Co., Elizabeth, N. J., has been elected vice president in charge of marketing operations for the Pigments and Abrasives Divisions. Mr. Collins was graduated from Massachusetts Institute of Technology, and was Chicago representative of the company's Harrison Abrasive Division when it was acquired in 1946.

♦ ♦ ♦

Stanley L. Martin has been appointed field engineer in southern Texas for Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, O., with headquarters in Houston. Mr. Martin was graduated from Youngstown College and has been with Republic Rubber in the Youngstown office for over a year.

♦ ♦ ♦

Henry P. Hejmanowski has been appointed Chicago regional manager, Lamson Corp., Syracuse, N. Y., responsible for sales and engineering of the company's conveyors, pallet loaders and blowers in Chicago, Kansas City, St. Louis, Dallas and Houston, Tex. Mr. Hejmanowski has been Chicago regional engineer for 2½ years. He was previously associated with Link-Belt Co., Chicago.

HENRY P. HEJMANOWSKI
. . . Lamson regional manager

♦ ♦ ♦

E. E. Esgate has been elected a vice president, Thew Shovel Co., Lorain, O. He joined the company in 1949 as assistant to the general manager and has been active in all phases of the company's operations since that time. Prior to joining Thew Shovel Co. he was engaged in development of equipment and methods of operation for handling of pulpwood in the pulp and paper industry.

A. G. Bissell, who retired in June after 17 years as head civilian of the Welding, Casting and Forging Branch, Bureau of Ships, U. S. Navy, has been appointed a consultant on engineering problems involving arc welding and its applications, for Metal & Thermit Corp., New York. His headquarters will be in Seattle.

♦ ♦ ♦

John A. Matousek, for two years vice president-manufacturing, Baker-Raulang Co., Cleveland, has been named vice president-general manager. A graduate of University of Notre Dame, Mr. Matousek joined the company in 1949 as manager of manufacturing.

♦ ♦ ♦

Joseph H. Homan has been appointed district manager of the Cincinnati office recently opened by Sipi Metals Corp., Chicago. Mr. Homan has been associated with the nonferrous metal industry for over 33 years. **Louis P. Schweer** and **Joseph L. Homan** have been appointed salesmen for the Cincinnati district.

♦ ♦ ♦

Frank Madrigal, chairman of the Mexico City Chapter of the American Foundrymen's Society for 1953-54, is associated with the Fundidora de Aceros Tepeyas S. A., in Mexico City. Mr. Madrigal served his apprenticeship in the plant of Julius Cilignan, in Guadalajara, Jalisco, and upon graduation from the technical school maintained by that organization was given the degree of master of foundry practice. From 1917 to 1948 he was in the United States and was associated with Ford Motor Co., Detroit, National Brake & Electric Co., Milwaukee, and Oklahoma Steel Castings Co., Tulsa, Okla. He spent 27 years with the latter company and was superintendent when he resigned and returned to Mexico, because of poor health. In 1950 he joined the Tepeyas Steel Foundry.

HAROLD E. COLLINS
. . . marketing operations

STANLEY L. MARTIN
. . . Republic Rubber sales

E. E. ESGATE
. . . Thew Shovel vice pres.

FRANK MADRIGAL
. . . heads Mexico City Chapter

CARL-MAYER'S *Important Development* in VERTICAL CORE OVENS

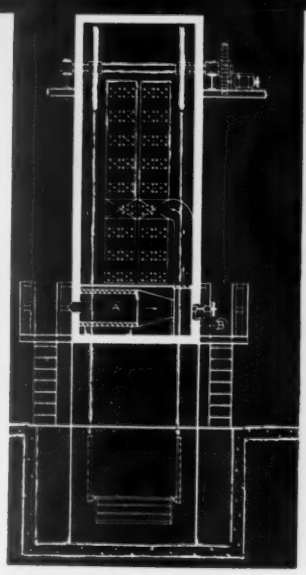


Fig. 1
NEW METHOD with heat fan inside oven. Patent No. 2628396.

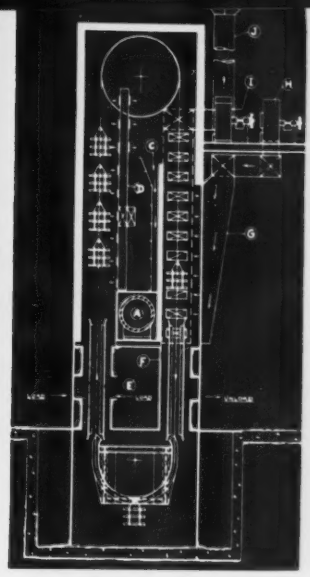


Fig. 2
Section showing conveyor travel thru pass, heating, cooling and exhaust system.

Vertical Ovens (Figs. 1 and 2) are by Carl-Mayer, using the universally adopted recirculating heating system with sealed combustion chamber located between the conveyor chains. Patent No. 2,257,180

EXCLUSIVE HEATING SYSTEM *pays off several ways!*

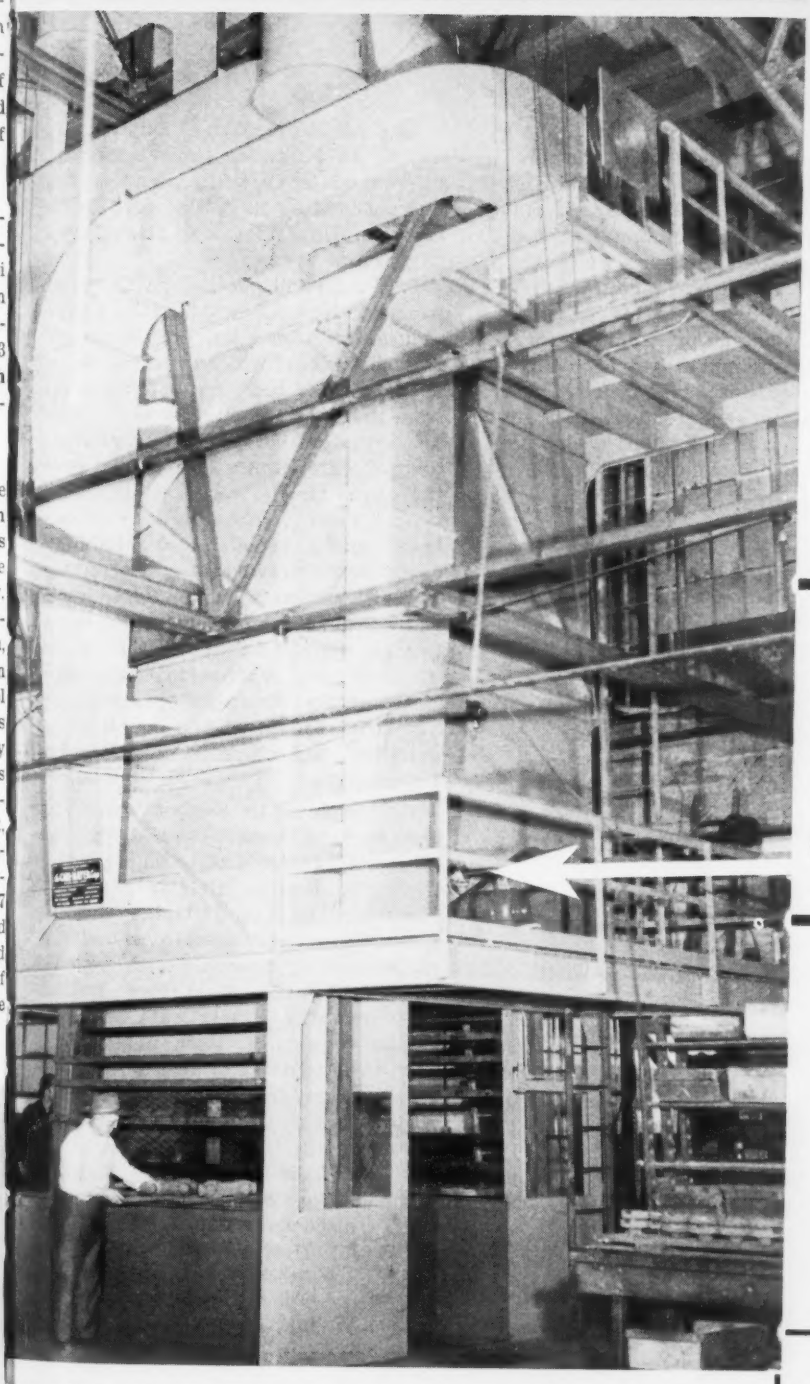
HEAT FAN INSIDE OF OVEN

- Saves platform space.
- Eliminates external heat duct, reducing heat losses.
- Placing heat fan *in* oven also reduces heat losses, resulting in high operating efficiency.
- By eliminating external heat duct and fan insulation, it reduces installation cost.
- There is no smoke as from external heat ducts.
- Oven appearance is greatly improved.

THIS IS BUT ONE OF THE REASONS WHY CARL - MAYER VERTICAL OVENS ARE THE CHOICE OF LEADING FOUNDRIES

Other important features contribute to faster baking, lower fuel consumption, smaller core losses, safer operation, elimination of smoke, cooled cores at unloading position and reduced labor cost.

Write for Bulletins No. 53-CM and HT-53



…t installation of Carl-Mayer Vertical Core Oven with combination gas and …red recirculating heating system, at G. & C. Foundry Co., Sandusky, Ohio

•

A few of our Vertical Oven Customers:

…inum Co. of America
…nd Malleable Iron Co.
… Motor Div. of …neral Motors Corp.
…illac Motor Div. of …neral Motors Corp.
…ric Autolite Co.
… Motor Co.
…ont Foundry Co.
G. & C. Foundry Co.
General Steel Castings Co.
Ingersoll Steel & Disc Div. Borg-Warner Corp.
Richmond Radiator Co.
H. B. Salter Co.
Union Brass & Metal Mfg. Co.
West Michigan Steel Castings Co.
A. C. Williams Co.

ALL TYPES OF CORE, MOLD OVENS

Also other types of Industrial Ovens and Furnaces

• • •

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Backed by reputation and over 30 years' Experience

ELECTRIC FURNACE OPERATORS

Meet in 11th Annual Conference

By EDWIN BREMER
Metallurgical Editor

ATTENDANCE of over 750 marked the eleventh annual Electric Furnace Steel Conference, held at the Netherland Plaza Hotel, Cincinnati, on Dec. 2, 3 and 4. During the meeting it was announced that Floyd O. Lemmon, Ohio Steel Foundry Co., Springfield, O., was elected chairman of the Electric Furnace Steel Committee of the American Institute of Mining and Metallurgical Engineers.

H. F. Walther, Timken Roller Bearing Co., Canton, O., and Clarence E. Sims, Battelle Memorial Institute, Columbus, O., were elected chairman and vice chairman, respectively, of the committee for the twelfth conference, to be held at Hotel William Penn, Pittsburgh, on Dec. 1 to 4, 1954. Ray H. Frank, Bonney-Floyd Co., Columbus, O., and W. M. Farnsworth, Republic Steel Corp., Massillon, O., were presented life memberships and certificates of award in recognition of their services to the conferences.

Opening technical session related to induction stirring in arc furnaces, and the chairman was D. J. Girardi, Timken Roller Bearing Co., Canton, O. Papers were presented by H. F. Walther, Timken Roller Bearing Co., Canton, O.; Eric G. Malmlow, Aros Electric Inc., New York; Quentin Graham, Elliott Co., Ridgway, Pa., and E. H. Browning and M. F. Jones, Westinghouse Electric Corp., East Pittsburgh, Pa.

Two types of stirring devices were described. One developed in Sweden uses the induction principle with suitable coils attached to the furnace bottom, which must be made of nonmagnetic material. Alternating current of extremely low frequency from ½ to 1 cycle is employed to create the stirring action. The other, developed in this country, employs a rotating magnetic field for that purpose. Advantages claimed for stirring of the molten steel bath are more uniform temperature between top and bottom, better contact between slag and metal, and increase in furnace capacity by use of a deeper bath than that which can be employed without such stirring.

Afternoon session, under the direction of L. W. Cashdollar, Union Electric Steel Corp., Carnegie, Pa., and Jack Atkinson, Dominion Foundries & Steel Co., Hamilton, Ont., dealt with application and manufacture of high-strength and high-alloy steels for the jet engine program, conservation of chromium, rapid bath analysis, and measurement of electric furnace bottom shell temperature. Discussions on application were presented by I. Perlmutter, Wright-Patterson Air Force Base, Dayton, O., and R. B. Johnson, General Electric Co., Evendale, O., while manufacture was outlined by S. B. Batdorf, Westinghouse Electric Corp., East Pittsburgh, Pa.

FLOYD O. LEMMON
Electric Furnace Chairman

RAY H. FRANK
Receives Award

T. W. Merrill, Vanadium Corp. of America, New York, described a procedure for production of low-carbon ferrochromium which results in a much greater recovery of chromium from the slag, and suggested that the method might be applied to manufacture of chromium steels to conserve the chromium required. Method involves use of silicon as a reducing agent, and a "repouring or reladling" operation to provide intimate contact of slag and metal which effects reversion of chromium from the slag to the metal. Adam Texter, Firth Sterling Steel & Carbide Corp., McKeesport, Pa., described operations at his firm's plant for production of stainless steel which followed a similar procedure.

For rapid bath analysis excellent results have been obtained by use of spectrographs, according to two speakers. George Delplace, Rotary Electric Steel Co., Detroit, gave information on results obtained with a direct-reading spectrometer, and H. C. Brown, Armco Steel Corp., Butler, Pa., presented similar data on a recording-type unit. Both pointed out that the instruments afford rapid determinations for production control, and accuracy obtained compares favorably with wet chemical methods. M. L. Windle and W. H. Magrun, Simonds Saw & Steel Co., Lockport, N. Y., discussed "Validity of Results of Rapid Methods of Analysis for High-alloy Steels," and indicated that a series of 30 or more comparative analyses will supply sufficient data to determine the maximum deviation to be expected.

Session concluded with descriptions of methods of measuring temperature of electric furnace bottoms by D. G. Harris, Republic Steel Corp., Canton, O., and H. C. Bigge, Bethlehem Steel Co., Bethlehem, Pa. Practice includes permanent insertion of

(*Concluded on page* 130)

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Right here on this page the best that we can do is remind you to swing to Smith L-O Core Oil.* If you are not already one of the many users, we want you to try it under your own conditions . . . to know through action why it shows a superiority for easy workability with sand, fast and accurate baking, clean shake-out, and all-around uniformity.

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- WESTERN FOUNDRY SAND CO. — Seattle, Washington
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SMITH OIL & REFINING CO.

MANUFACTURERS OF L-O AND CERTIFIED CORE OILS
INDUSTRIAL OILS DIVISION • ROCKFORD, ILLINOIS

(*Concluded from page* 128)

thermocouples a short distance into the bottom refractory at several different locations. From the temperature indications the furnace operator can determine when and where to make suitable repairs to the bottom, and thus extend bottom life to a considerable degree.

Two technical sessions of the conference were devoted to the steel castings branch of the industry. One related to inclusions in steel and the other to mechanical aspects of electric furnace operations. Clyde Wyman, Burnside Steel Foundry Co., Chicago, presided at the first session.

C. F. Christopher, Continental Foundry & Machine Co., East Chicago, Ind., presented a paper on "Deoxidation and Its Effects on the Physical Properties of Steel" in which he suggested that in the production of acid steel there is a critical oxygen level below which type II inclusions are formed by precipitation of iron sulphide in the grain boundaries. With that premise he preferred silicon as a deoxidation agent since it was less powerful than aluminum, and hence would not decrease the oxygen content below critical level.

Need Further Explanation

In the discussion Clarence E. Sims, Battelle Memorial Institute, Columbus, O., pointed out that data given by the speaker need further explanation and more detail to ascertain what actually was taking place. In a written discussion by Charles Donoho, American Cast Iron Pipe Co., Birmingham, Ala., and presented by Carl Carlson of the same firm, it was stated that silicon-killed steels can be cast sound in green sand without aluminum, and that the silicon required for soundness increases with increasing carbon.

Walter Crafts, Metals Research Laboratory, Electro Metallurgical Co., Niagara Falls, N. Y., presented a paper prepared in co-operation with D. C. Hilty of the same firm on "Observations of Sulphide and Oxide Formation in Steel" as a progress report on the subject. Indications are that a given amount of oxygen in relation to sulphur is required to form inclusions, and the relationship is important. However, so far the work is a highly theoretical consideration due to difficulty in determining actual phase reactions. A possibility exists that inclusions form due to the presence of submicroscopic oxide particles in the steel.

Session concluded with a brief discussion of electric furnace operation, with Charles W. Briggs, Steel Founders' Society of America, Cleveland, as discussion leader. One question asked was on how high carbon should be on meltdown in relation to final desired content. Consensus was that carbon should not be any higher than that which can be removed by oxygen or ore without getting the steel too hot, and still provide a good active boil. In further discussions it was stated that the more rapid the removal of carbon, the better the physical properties of the steel. One speaker said that he obtained good results in carbon reduction by using half ore and half oxygen injection. Another stated that he added ore about halfway in the meltdown, and reduced carbon at a rate of 0.01 per cent per minute.

In the afternoon session, with Victor E. Zang, Unitcast Corp., Toledo, O., presiding, fume control and new developments in arc furnace design and operation were considered. O. E. Erickson, Hanford Foundry Co., San Bernardino, Calif., gave a brief resume of dust control of electric steel foundries in the Los Angeles area. One difficulty of the dust is its fine size—nearly 68 per cent being 5 micron and under—and its high angle of repose which causes adherence to filter fabrics. According to Mr. Erickson the most efficient system so far is a tube-type bag filter using orlon bags and combining an adequate reverse airflow with mechanical shaking.

"Mr. Otwell feels there is something amiss."

C. A. Faist, Burnside Steel Foundry Co., Chicago, stated that his firm tried wet collectors but found them unsuccessful for particles less than 10 micron size. Then a baghouse was installed, using orlon dusted with lime to resist acid, and that system removed 0.88 grains per cu ft of air exhausted. However, he pointed out that the biggest difficulty at present is a practical means of enclosing the furnace so that all fumes and dust generated are forwarded through the system.

E. Knaggs, Swedish Crucible Steel Co., Detroit, said that he used a wet collection system with good results, but the lower section of the unit had to be made of stainless steel to eliminate corrosion due to sulphur gases emanating during the melting operation. In the discussion attention was directed to the fact that codes relative to dust and fume emanation vary considerably from city to city, and equipment suitable for elimination in one would not be applicable at all in another. Consensus was that the code of the Los Angeles area is the strictest on record.

New developments in electric furnace design were described by W. E. Lewis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh; Charles W. Vokac, Hydro-Arc Division, Whiting Corp., Harvey, Ill., and E. A. Hanff, Swindell Dressler Corp., Pittsburgh. Various features mentioned were increased weight and strength of present day furnaces, increased use of nonmagnetic metals to reduce deterioration of insulation due to inductive heating, more thorough cooling, use of larger roof rings extending beyond the shell to protect them from heat and flame, increasing use of air circuit breakers, possibility of application of on-load tap changers, new regulator and electrode control, and greater capacity transformers.

Green and Dry Sand Practice

Session concluded with a discussion of electric furnace practice under the direction of Charles W. Briggs. It was stated that there is no necessity for change in practice for green and dry sand molds—some foundries pour both out of the same heat. Furnace slag can be held back from entering the ladle in several ways. Some use a sand bridge or dam in the spout, others use a baked sand core for the purpose while still others insert a tile filled with burlap or old rags in the taphole, and tilt the furnace quickly.

In reply to a question on substituting nickel oxide sinter for electrolytic nickel, one operator stated that he substituted 25 per cent, placed in the charge, for stainless steel. In response to a query on a good method for increasing the carbon content in the ladle, one member said that he used No. 8 Mexican graphite with 67 per cent recovery. Metal stream must be hot, the slag must be held back, and the graphite thrown in at the junction of the stream from the furnace with the metal in the ladle.

It was pointed out that 4 to 6 per cent-chromium steel has a tendency to crack during snagging and welding, and practice is to heat to 1500° F and furnace cool before grinding. Also the steel should be preheated to 900° F prior to welding operations.

SANDCUTTER'S *whirling blades help beat the cost spiral*

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**For 46 years—in thousands of foundries SANDCUTTER has been the low-cost method of getting a quality-conditioned sand.*

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With a Sandcutter on the job you can be sure of lower unit costs, too, through savings all along the line; fewer man-hours for sand conditioning, less time required for grinding, cleaning and inspection, less labor turnover and increased production.

Since 1908 more than 1500 Sandcutters have been installed in jobbing and production shops of every type. As an investment in profitable sand conditioning they are hard to beat. They pay dividends for many years—many are still in operation today that are 20 and 25 years old—and they are still going strong.

Save manpower — step up the whole efficiency of your foundry with a Sandcutter. There's a size and type to meet your needs. Write for literature today.

Write today for catalog No. 25-A describing the Sandcutter for cutting average size floors.

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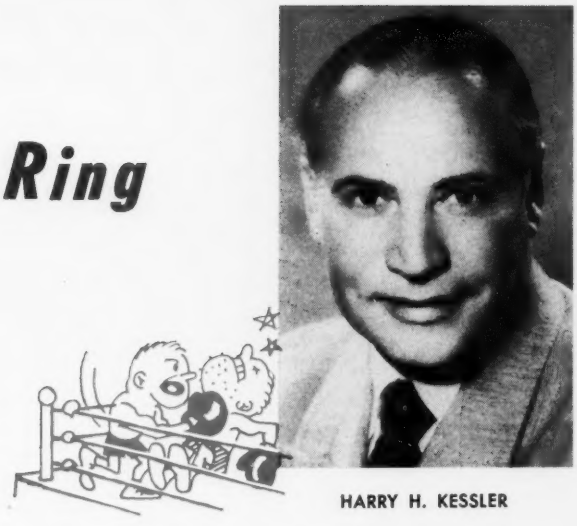
SANDCUTTER®

3rd Man in the Ring

By BEN K. PRICE
New York Editor



HARRY H. KESSLER

IT IS seldom that a person gets mixed up in two such highly divergent lines as metallurgy and boxing-refereeing and becomes highly expert at each. Yet the foundry industry has just such a man—and if any other industry can make similar claim, let it speak up at once or forever hold its peace.

The gentleman, of course — as many a foundryman with even a passing interest in boxing, can tell you—is Harry H. Kessler, of St. Louis, co-owner of Sorbo-Mat Process Engineers, president of the Sorbo-Cast Corp., New Brunswick, N. J., and president of the Controlled Castings Co., St. Louis. Kessler is a man with many interests all over the country, for he travels about 200,000 miles a year (which is plenty of mileage in any man's book) in pursuing his engineering and refereeing.

Intercollegiate Champ — Harry comes naturally by his avocation of refereeing. As an undergraduate at the Missouri School of Mines, he had a boxing record of no defeats in four years; in 1922 he was intercollegiate boxing champion in the welterweight division. In his earlier years he taught boxing in St. Louis at the YMCA and YMHA, and since then he has continued his fight interest by refereeing, whenever time allowed, in any part of the world wherever he happened to be.

Now 52, this foundry executive has refereed more than 3000 boxing matches both professional and amateur. He now referees about 30 major bouts a year, including a number at Madison Square Garden and the St. Nicholas Arena in New York. Actually, he has licenses to referee in seven different states. His fees for refereeing ($50 to $150 a clip) are turned over to worthy children's charities.

"Millionaire Referee"—As the years have passed he has acquired several colorful sobriquets for his performance in the ring, including "boxing's millionaire referee". He doesn't think much of that one, although, as pointed out somewhere by someone, he does appear to be solvent. Kessler's decisions are in agreement with the majority about 95 per cent of the time.

Harry is a strong believer in the system of a referee and two judges when it comes to fight decisions. Three heads, says he, are definitely better than one. But he recalls the time when the referee was the sole arbiter and when he, as sole arbiter, had a system of his own for scoring.

The Penny System—For a 10-round bout, he placed ten pennies in his watch pocket. At the end of each round, he shifted one penny to either the left- or right-hand pocket, depending upon which contestant won the round. After it was all over, he would put his hands in his side pockets and stand there meditatively. To some in the audience, he was probably figuring out the decision by means of calculus. But actually he was doing no such thing. He was simply counting the pennies.

The only trouble with that system, as we see it, is—how did he remember which pocket represented which fighter? Yet he claims he never got mixed up. So much for a good engineering training.

Harry's early contact with the foundry industry was with American Steel Foundries, Granite City, Ill., where he worked during summers while going to college. Upon graduating in 1924, he went to the Hammond, Ind., plant of American Steel Foundries as a metallurgist. A year later he went to work for the American Manganese Steel Co., St. Louis, where he stayed until 1930, when he joined the Banner Iron Works, that city, as foundry superintendent.

Gray Iron Processing — It was shortly later that he and Reginald Drant began their particular research into the use of alloys for processing gray iron. In 1933, they formed a partnership known as Sorbo-Mat Process Engineers. There are now some 50-odd companies in this country, Canada and Mexico, using the Sorbo-Mat Process under a license arrangement. The partnership maintains consulting offices in St. Louis and in New York.

Harry Kessler is well known throughout the foundry industry as a frequent lecturer on foundry practice at colleges and various foundry and engineering society groups. His specialty is the gating and risering of castings and his lectures are sought by groups all over the country.

He is a member of the American Foundrymen's Society, American Institute of Mining and Metallurgical Engineers and the Institute of British Foundrymen.

Despite his traveling, he does, as indicated previously, have a home. He has a wife, who is a playwright, and three children—a daughter 14, a son 4 and another son 2.

Harry is getting a lot out of life, but he is putting a lot into it. One of his remaining ambitions is to referee a world championship fight in Madison Square Garden. He has refereed a number of title bouts, and it is our hunch that he will succeed in this ambition one of these days.

Costs down 67%
Production up 400%

TOCCO-brazing drive shaft assemblies—two at a time. Photo—courtesy Mechanics Universal Joint Division of Borg-Warner Corporation.

with TOCCO* Induction Brazing

The shift from welding to TOCCO* induction brazing of the drive shaft assembly pictured here is typical of savings accomplished by TOCCO in over a thousand of America's leading metal-working plants. If you have brazing, soldering, heat-treating or heating for forming or forging operations in your plant TOCCO can probably save you money too.

COSTS DOWN 67%—Mechanics Universal Joint Division of Borg-Warner reports a 67% cost reduction in TOCCO-brazing yokes to tubing in the manufacture of power transmission shafts. Formerly, parts were hand-welded.

PRODUCTION UP 400%—Automatic TOCCO increases production from 11 to 45 pieces per hour—400% faster than former method. In addition TOCCO-brazing produces a cleaner, neater joint than possible with previous method.

TOCCO Engineers are glad to survey your plant, without obligation, of course, to determine where TOCCO Induction Heating can speed your production and cut your manufacturing costs.

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News Views

SHELL ON HEAD: "Shell on Head—We're not Dead" is the motto of the 200 U. S. members of the Turtle Club, men whose lives were saved because they were wearing hard hats. Award of the 200th membership was made during the National Safety Congress in Chicago, to Mike Sikurenic, of Johnstown, Pa., a slagger at Bethlehem Steel Co. Left to right are Carter Kendall, director of safety, Bethlehem Steel, and W. W. Brant, director of safety at the Johnstown plant, who received the certificate for Mr. Sikurenic from E. W. Bullard, president, E. D. Bullard Co., San Francisco, U. S. club sponsor, as Robert Gidel, director, Metals Section, National Safety Council, right, looked on

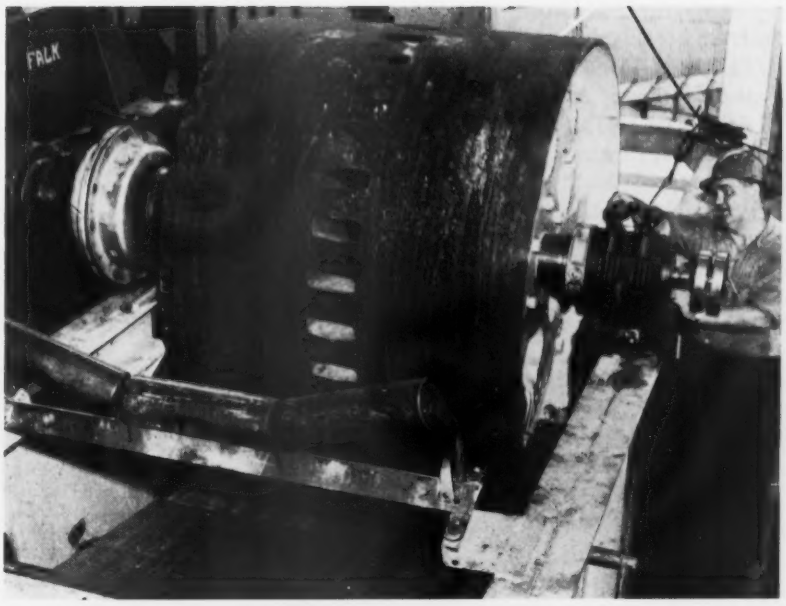
A MERGER EMERGED: Discussing the details of the recent merger of Callander Foundry & Mfg. Co., Guelph, Ont., with Rockwell Mfg. Co., Pittsburgh, are, left to right: W. F. Rockwell Jr., president of Rockwell, who has been named chairman of the board of Callander; W. W. Brydges, president of Callander, who will continue in the same capacity; and W. F. Rockwell, chairman of the board of Rockwell. Callander will operate under its present management, as a wholly owned subsidiary

LIGHTWEIGHT CASTINGS: More than 64 lb of aluminum and magnesium castings are used in 1954 Chrysler sedans. In addition to the aluminum torque converter housing the young lady is holding, parts shown include pistons, oil filter housing, fuel pump, torque converter parts, automatic transmission parts, steering column shroud, parts of the carburetor assembly and others

FOURTH GENERATION: Fourth generation descendant of the company's founder, Franklin Farrel III, executive vice president, Farrel-Birmingham Co., Ansonia, Conn., second from left, received a 20-year pin from Joseph LeMay, corporation secretary, at an annual service pin award recently. Looking on, left and right respectively, are Edward Kennedy and Edward Stuart, 59-year veterans

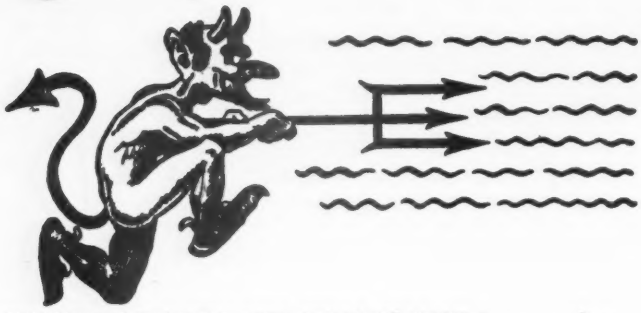
ABRASIVES ON WHEELS: Carborundum Co., Niagara Falls, N. Y., has set up a 19-ton mobile unit that is 35 ft long and 12½ ft high to demonstrate more than 20 coated abrasive grinding operations under actual production conditions. The traveling workshop contains a total of eight stationary coated abrasive grinding machines and a variety of portable tools. Now on tour, it will make an average of about 30 one-hour demonstrations a week at five per day

WHITING PREVIEW: Over 250 New York area industrialists were guests of Whiting Corp., Harvey, Ill., on Nov. 18, in New York, at a reception which included a preview of the company's plans for its 70th year. In conference here, left to right, are W. C. Mulligan, Whiting Corp.; Stevens H. Hammond, Whiting's chairman of the board; Frederick M. Gillies, Acme Steel Co., a Whiting director; and Col. Roy B. Willis, chairman of the board, Baltimore & Ohio Railroad



MAGNET AT WORK: Believed to be the largest electromagnetic pulley in the world, this product of Stearns Magnetic Inc., Milwaukee, is 60 in. in diameter and has a 48-in. face. It is installed in the Oak Creek power station of the Wisconsin Electric Co., for the removal of tramp iron from coal. A new type of lagging is said to provide superior traction, but at the same time to permit the magnet to operate at top strength

Soffel's



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for all

Metals and Alloys

THERMOTOMIC "X" COMPOUND is an exothermic material which is molded and baked into necked down riser cores and inserts. It produces a temperature of 3500° F. and is used as ring inserts under the risers or feeding heads. Great savings are realized through reduced riser dimensions and cleaning costs. In conjunction with Thermotomic Compounds Carbon Free Liquidizer No. 5 should be used on top of the metal in the heads.

THERMOTOMIC ABC—For aluminum and magnesium castings, necked down riser cores and inserts—prevents piping and shrinkage into castings. Soffel's ALX-31 Liquidizer should be used on top of the metals in the head.

THERMOTOMIC HoTop LIQUIDIZER — For short risers—save 60 to 70% of feeding metal in the heads.

EXOTHERMIC CARBON FREE LIQUIDIZER A feeding head compound for castings and ingots of ferrous and non-ferrous metals—saves metal and prevents piping and shrinkage.

CARBON FREE LIQUIDIZER AL-X31—For aluminum and magnesium feeding heads—prevents piping.

EXOTHERMIC INSULATING SLEEVE CORE COMPOUND—For riser sleeves—adds heat and prolongs fluidity of feeding metal in heads or risers.

DENSILTITE LADLE FLUX—For iron and semi-steel—reduces sulfur and phosphorous. Adds fluidity and temperature in pouring ladles—produces clean iron.

SOFFEL'S NON-FERROUS FLUXES

BB-2—For red brass, nickel and tin bronze pressure castings—removes sulfur, iron, phosphorous oxides and gas from brass and bronze.

SUPER BRASS FLUX—For brass and bronze—Prevents oxidation of zinc.

BRASS REFINING FLUX—For cupola melting and open flame furnaces — prevents oxidation. Produces liquid slag and faster melting.

COVERALL BRASS FLUX—Removes gas and oxides from yellow brass and nickel silver.

RADIOCLARITE BRASS FLUX—For open flame furnace melting—increases fluidity, tensile strength, removes gas, oxides and iron.

AB-6 BRASS FLUX—For electric furnace melting of brass and aluminum bronze—keeps furnace linings clean.

KLEEN-ALL BRASS CLEANER—For use in bottom of pouring ladles or open flame furnaces to absorb liquid slag and keep the furnace and ladle linings clean.

BRASS ALUMINUM REMOVER — Removes all traces of aluminum from copper, brass or bronze.

HI-LED BRONZE FLUX—Holds lead up to 50% in copper without use of nickel.

NICKEL MONEL FLUX—Removes gas and adds fluidity to metal.

ALUMINUM BRONZE FLUX—A perfect deoxidizer for reducing aluminum and iron oxide in manganese bronze and aluminum bronze. Adds fluidity.

COPPERTITE FLUX—For high conductivity castings—removes cuprous and cupric oxides and gas from copper.

FERRO-OUT IRON REMOVER—Removes free iron or alloyed iron from brass, bronze or copper.

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KLEN ZINC FLUX—A deoxidizer and purifier for zinc base pressure die castings—removes gas, sulfur and iron.

DIE COATING—For pressure zinc base die castings —will not scale, blister or create gas in the molds.

PERMANENT MOLD COATING—For aluminum and magnesium castings — adds longer life to molds. Produces clean gas free castings.

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U. S. Patents No. 2,490,327 and No. 2,500,097

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How To Make Sure Your Slings Are Safe

By WALTER C. RICHARDS
Chief Engineer
Leschen Wire Rope Division
H. K. Porter Co. Inc.

IT IS very essential for the sake of safety that slings of sufficient strength be selected. In making the selection, where two or more legs are involved, consideration must be given to the important fact that the stress in a sling varies with the angle at which the legs are used.

In this discussion it is assumed that the loads are approximately symmetrical and in balance, and that the legs are of equal length. If a sling is to be calculated for an unbalanced load—where one leg will handle a greater weight than the other—this must be clearly indicated, and a sketch should be submitted to the supplier showing the location of the center of gravity.

The typical bridle sling is seldom used with both legs vertical. They are generally spread apart. If the legs are to be vertical, the full safe working load of the sum of the two ropes is available. When the legs are spread at an angle, the allowable safe working load will decrease as the angle increases.

How to Calculate Capacity—For a sling of given rope diameter the rated capacity at 60 degrees, 90 degrees and 120 degrees would be calculated by using the percentages, as shown in Fig. 1, or for any angle by reference to Fig. 2.

The degree of spread may be designated either by the included angle at the hook, or by the angles made by the legs with a horizontal plane.

In the case of a sling with equal length legs, spread at an angle of 60 degrees at the top, the legs would also make an angle of 60 degrees with the horizontal. If the angle at the top were 90 degrees, the legs would make an angle of 45 degrees with the horizontal. The relationship is based on the law that the sum of the interior angles of a triangle is 180 degrees.

How to Calculate Rope Diameter—To determine the diameter of rope to be used for given conditions, the stress in each leg of a two-legged sling is taken as equal to half the load divided by the sine of the angle at which the leg is inclined to the horizontal.

Fig. 3 shows how the tension in the rope increases as the angle with the horizontal decreases. For example, Diagram "F" demonstrates what a very high tension is produced when a sling is used at a very flat angle.

Fig. 2 (Sling Angle Calculation) may be used in determining the rated load capacity of a given sling or in calculating the proper rope to use for a given load.

The sloping lines correspond to the legs of the sling taken at intervals of 5 degrees. They may be used as shown by the diagram in the upper left-hand corner to determine the angles formed by the legs at the ring or link, and with a horizontal plane.

To illustrate this, a triangle is shown in heavy lines, one side of which is detailed as the leg of a sling. The legs form the 60-degree angle "A" at the top, and two 60-degree angles "B" at the bottom, between the legs and a horizontal plane.

The angle of spread (at ring or link) is shown in the vertical column *A*. The figures shown under *B* are the angles between the legs and a horizontal plane and are the ones used in the calculations. Under *C* are the factors to be used in determining the rated capacities and under *D* the factors used when calculating the diameters of the rope required.

Examples—(1) What is the rated

TABLE I—Rated Capacities for Standard Single Wire Rope Slings

Rope Diameter in Inches	In Tons of 2000 Pounds				
	Vertical Hitch	Anchor Hitch	Basket Hitch, Position of Legs		
			Vertical	60°	45°
6x19 Fiber Core					
3/8	.9	.7	1.8	1.5	1.2
1/2	1.5	1.2	3	2.6	2.1
5/8	2.3	1.7	4.6	4	3.2
3/4	3.4	2.8	6.8	5.9	4.8
7/8	4.6	3.8	9.2	7.9	6.5
1	6	4.9	12	10.4	8.5
1 1/8	7.5	6.2	15	13	10.6
6x37 Fiber Core					
1 1/4	8.7	7.2	17.4	15	12.3
1 3/8	10.6	8.7	21.2	18.3	15
1 1/2	12.6	10.4	25.2	21.8	17.8
1 5/8	14.7	12.1	29.4	25.4	20.8
1 3/4	17	14.1	34	29.4	24
1 7/8	19.5	16.1	39	33.8	27.6
2	22.1	18.3	44.2	38.3	31.2

Note: Data apply to slings made of Hercules (Red-Strand) wire rope. Rated capacities shown provide a design factor—varying with the rope diameter—of from six to seven. The table is based on an average diminishing splicing efficiency of from 95 per cent to 75 per cent. For slings with wire rope core add 7½ per cent to the rated capacities shown.

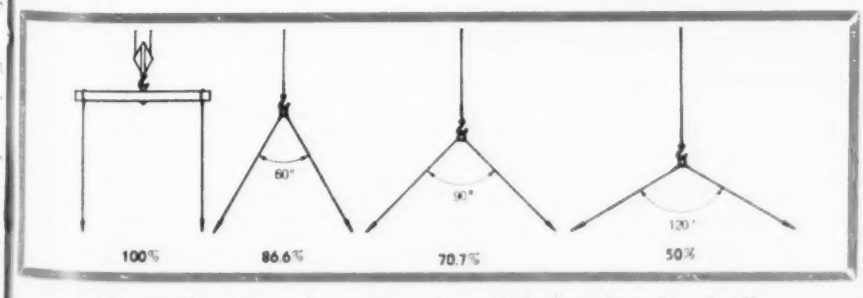

Fig. 1—This chart shows how the rated capacity of a bridle sling decreases as the angle of the leg spread is increased

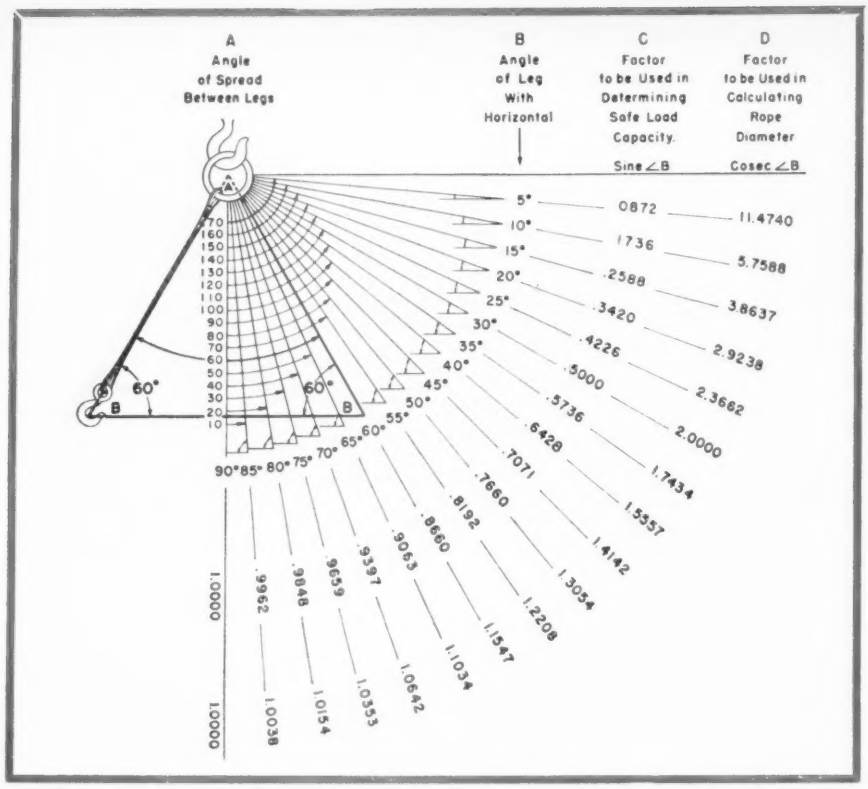

Fig. 2—Chart used to determine the rated capacity of a given sling or to calculate the proper rope to use for a given load. Sloping line correspondents to legs of the sling taken at intervals of 5 degrees

capacity that may be handled with a two-leg bridle sling made of ⅝-in. diam Hercules Red-Strand wire rope, where the conditions require that the legs be spread at an angle of 70°?

From Fig. 2 it will be seen that if the angle of spread between legs is 70°, the angle (B) that each leg makes with the horizontal (when in balance) is 55 degrees. A stress of 2.3 tons (see first column of loads in Table I) could be safely applied to each leg, and 4.6 tons or 9200 pounds total for the sling if used vertically. To determine the rated capacity at the required angle the figure 9200 is multiplied by the factor .8192 shown in column *C* opposite the 55° horizontal angle (Fig. 2). Required rated capacity W, at given angle of spread = safe load for two vertical ropes × factor in column *C* = 9200 × .8192 = 7536 lb.

(2) What diameter rope must be used in a two-leg bridle sling to handle 10,000 pounds when legs are spread at an angle of 80°?

As in the first example the chart will show that with the legs spread at an angle of 80° the horizontal angles would be 50° each. One half the load or 5,000 pounds must be carried by each leg.

To calculate the tension developed in each leg by this vertical load of 5000 lb, multiply the load by the factor in column *D* opposite the angle of 50°. Tension T in one inclined leg = ½ total vertical load × factor in column *D* = 5000 lb × 1.3054 = 6527 lb.

Applying a factor of 7, a rope with a breaking strength of 45,689 lb or 22.8 tons is required. This would indicate a ¾-in. 6 x 19 wire rope. Or from the first column under rated capacity it will be seen that to handle 6527 lb safely on a single leg, a ¾-in. rope is needed. (Table I)

OBITUARY

WILLIAM S. MILLER, 65, eastern manager, Charles C. Kawin Co., Buffalo, died Nov. 15. Mr. Miller attended Purdue University and joined the company in 1919. He was a member of the Western New York Chapter of the American Foundrymen's Society and of the American Society for Testing Materials.

* * *

Robert Malcom Sr., 82, chairman of the board, Chicago Eye Shield Co., Chicago, died Nov. 27. Mr. Malcom founded the business in 1903 and was active until shortly before his death. He was responsible for the design and development of a variety of safety equipment for head and eye protection.

* * *

J. Walter Jeffrey, 73, director and former vice president, Jeffrey Mfg. Co., Columbus, O., died Nov. 21. A graduate of Williams College, Mr. Jeffrey was the son of the founder of the company. He retired 10 years ago.

* * *

Raymond P. Scully, president, Scully Machinery & Equipment Co., Chicago, died Nov. 26. Mr. Scully was vice president of Scully-Jones & Co., Chicago, until 1942 when he organized his own equipment company.

* * *

George R. Harrington, 48, foreman, Jardine Bronze Foundry Inc., Baldwinsville, N. Y., died Nov. 28. Mr. Harrington had been with the company 8 years.

* * *

John T. Jones, 35, sales representative, Vesuvius Crucible Co., Pitts-

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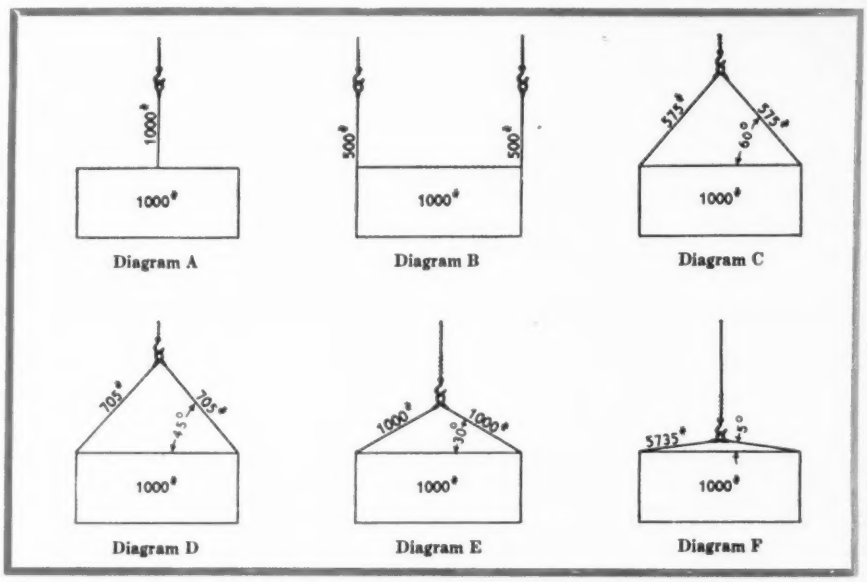
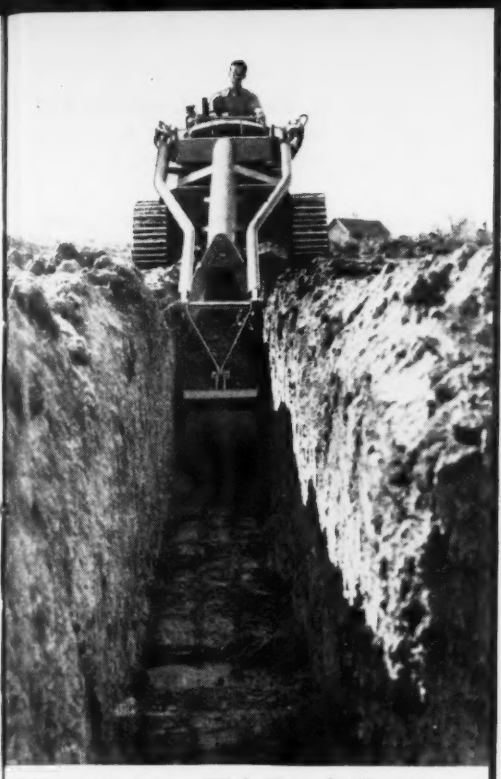


Fig. 3—How tension in a sling increases as the angle with the horizontal plane increases. It is maximum when sling is used at flat angle

New Materials-Handling Technique Features Tractor Shovel with Quick-Change Front End

Equipment flexibility is an important answer to high production costs. This accounts for the popularity of the thousands of Allis-Chalmers HD-5G Tractor Shovels now in use in plants of all kinds. The 40-hp. crawler, with its wide range of front-end attachments, digs, carries, dumps, stockpiles, spreads or loads materials of all kinds. Its power and versatility enable it to replace a fleet of part-time specialists . . . to pay its way *full time* both in and around the plant.



DIGS TRENCHES — With Trench Hoe attachment, the HD-5G digs a flat-bottom ditch 27 in. wide and to a depth of 8 ft. Ideal for laying pipe, digging foundation footings, other vertical excavations.

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ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

(*Concluded from page* 138)

burgh, died Nov. 22. Mr. Jones was graduated from University of Minnesota, and was associated with Republic Steel Corp. in Canton, O., and Chicago, until he joined Vesuvius Crucible Co. 5 years ago.

* * *

Edmund P. Kinne, 78, former mechanical engineer at the Alliance, O., plant of American Steel Foundries, Chicago, died Nov. 2. Mr. Kinne was graduated from University of Michigan and joined the company's Alliance branch in 1905. He retired in 1946.

* * *

Eugene G. Fauntleroy, 61, vice president and director, Moline Malleable Iron Co., St. Charles, Ill., died Nov. 17. Mr. Fauntleroy was a graduate of University of Michigan.

* * *

D. Clyde Short, 67, president-general manager, Saturn Foundry & Machine Co., Wheeling, W. Va., died Nov. 9.

* * *

William C. Wine, foundry superintendent, Sibley Machine & Foundry Corp., South Bend, Ind., died Nov. 18.

* * *

William G. Mealor, owner of Gainesville Iron Works, Gainesville, Ga., died Oct. 12.

Charles J. Miller, chairman of the board of directors, Fremont Foundry Co., Fremont, O., died Nov. 11. From 1901-1906 Mr. Miller was associated

CHARLES J. MILLER

with Ferro Machine & Foundry Co., Cleveland, and spent the next 14 years with Henry Furnace & Foundry Co., Medina, O. In 1920 he organized Fremont Foundry Co. and became its president. He was president of the Gray Iron Founders' Society in 1939-41 and one of its directors in 1939-42. In 1947 he received the Gray Iron Founders' Society citation for outstanding contributions to the society and industry.

Arthur M. Barker, 66, founder and owner of Barker Foundry & Supply Co., Los Angeles, died Nov. 3.

* * *

Russell O. Darbyshire, vice president, Darbyshire Steel Co., El Paso, Tex., died Oct. 23.

* * *

Samuel E. Bool, 83, for more than 50 years associated with Pickands, Mather & Co., Cleveland, died Dec. 4. Mr. Bool joined the company in 1887 and was bookkeeper, cashier and auditor, retiring as partner in 1942. He was a director of Penton Publishing Co., Cleveland.

Book Review

Procedures in Experimental Metallurgy, by A. U. Seybolt, Ph. D., and J. E. Burke, Ph. D., cloth, 340 pages, 6 x 9 in., published by John Wiley & Sons Inc., New York. Price $7.

Primary aim of the authors has been to describe most of the important laboratory techniques now used in the preparation of metals and alloy specimens for further study. Investigational techniques such as microscopic examination, x-ray diffraction methods, thermal analysis and mechanical testing are purposely omitted because satisfactory works on these subjects already are available.

Meetings of Interest to Foundrymen

Jan. 22—Malleable Founders' Society, general meeting, National Malleable & Steel Castings Co., Cleveland.

Jan. 25-28—Plant Maintenance & Engineering Show, International Amphitheater, Chicago. The **Plant Maintenance & Engineering Conference** will be held concurrently at the Hotel Conrad Hilton, Chicago

Feb. 1-5—American Society for Testing Materials, committee week, Hotel Shoreham, Washington, D. C.

Feb. 11-12—Wisconsin Regional Foundry Conference, Schroeder Hotel, Milwaukee

Feb. 18-19—Southeastern Regional Foundry Conference, Patten Hotel, Chattanooga, Tenn.

Mar. 10-11—Foundry Educational Foundation, annual conference of advisory committees and annual meeting, Hotel Cleveland, Cleveland

Mar. 15-19—National Association of Corrosion Engineers, tenth annual conference and exhibition, Kansas City

Mar. 16-17—Steel Founders' Society of America, annual meeting, Edgewater Beach Hotel, Chicago

Apr. 5-7—American Institute of Mining & Metallurgical Engineers, national open hearth conference, Palmer House, Chicago

Apr. 8-9—Malleable Founders' Society, market development conference, Carnegie Institute of Technology, Pittsburgh

May 4-7—American Welding Society, national spring technical meeting, Hotel Statler, Buffalo

May 5-7—American Society of Training Directors, annual conference, Hotel Schroeder, Milwaukee

May 5-8—American Welding Society, welding and allied industry exposition, Buffalo Memorial Auditorium, Buffalo

May 8-14—American Foundrymen's Society, annual convention and exhibition, public Auditorium, Cleveland

May 17-20—Basic Materials Exposition, International Amphitheater, Chicago

June 14-15—Malleable Founders' Society, annual meeting, Seigniory Club, Province of Quebec, Canada

June 14-18—American Society for Testing Materials, annual meeting, Hotels Sherman and Morrison, Chicago

Sept. 27-28—Steel Founders' Society of America, fall meeting, the Greenbrier, White Sulphur Springs, W. Va.

Oct. 6-8—National Foundry Association, 56th annual meeting, Hotel Sheraton, Chicago

Oct. 14-16—Foundry Equipment Manufacturers' Association, annual meeting, the Greenbrier, White Sulphur Springs, W. Va.

Nov. 1-5—American Society for Metals, National Metal Congress and Exposition, International Amphitheater, Chicago

Nov. 11-12—Gray Iron Founders' Society, annual meeting, the Homestead, Hot Springs, Va.

Dec. 1-4—American Institute of Mining & Metallurgical Engineers, electric furnace steel conference, Hotel William Penn, Pittsburgh

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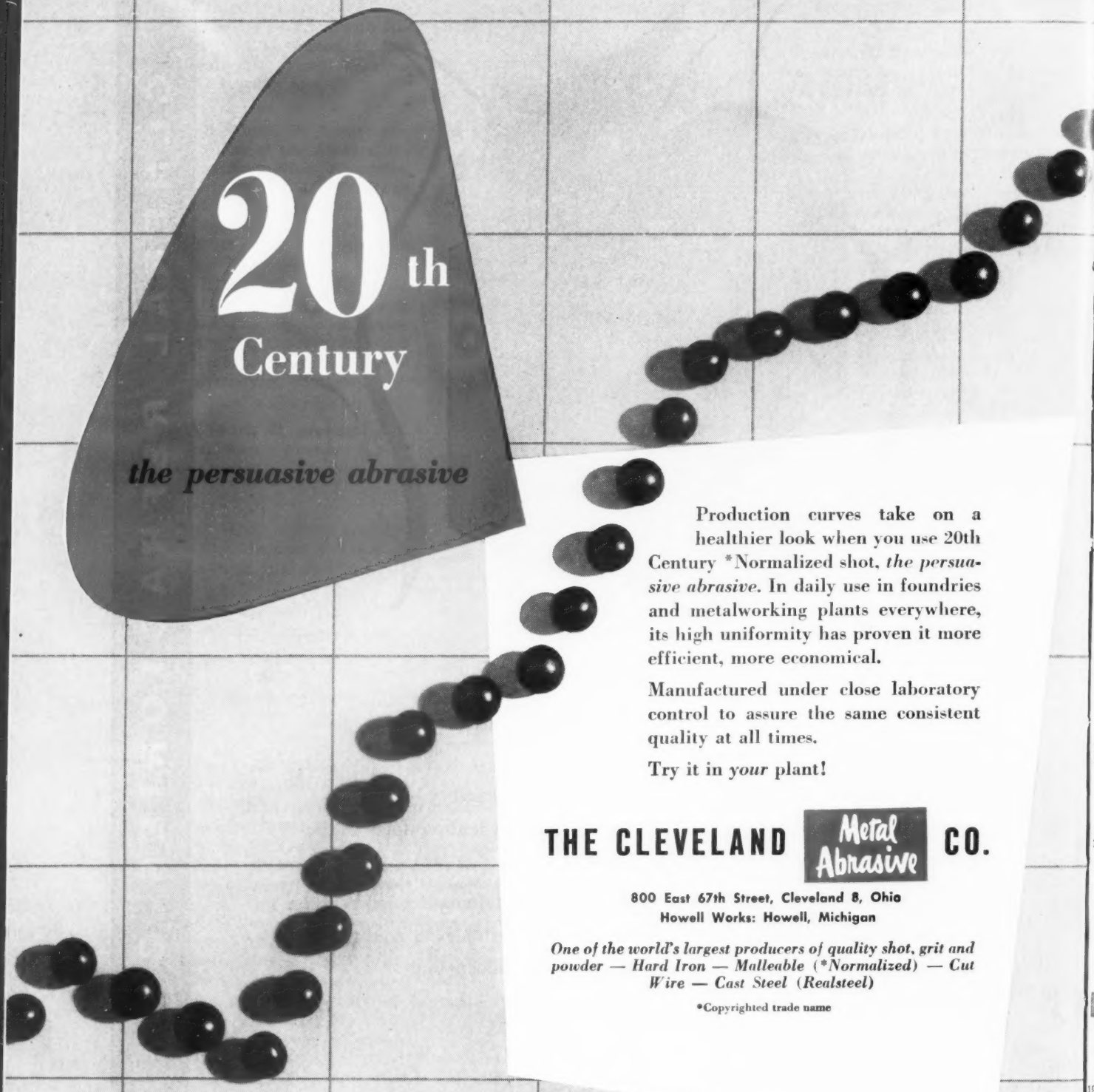

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Foundry Statistics

Malleable Iron

(Shipments of castings—net tons[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1951	1,085,241	656,076	.....
1952			
Sept.	75,950	45,849	168,367
9 mo.	681,279	423,357	.....
Oct.	88,062	52,922	168,609
Nov.	76,099	46,708	167,842
Dec.	80,680	50,485	173,494
Total	926,120	573,472	.....
1953			
Jan.	87,249	53,272	174,809
Feb.	86,515	51,963	175,088
Mar.	94,481	57,025	177,776
Apr.	95,923	57,757	174,514
May	82,050	48,011	160,387
June	86,514	50,819	151,016
July	77,111	45,413	137,251
Aug.	73,855	45,415	120,801
Sept.	74,333	45,466	114,523
9 mo.	758,031	455,141	.....

Aluminum

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Sand	Perm. Mold	Die	Unfilled Orders[2]
1951	515,131	193,378	160,011	151,465	.....
1952[3]					
Sept.	45,430	16,733	12,515	15,888	127,777
9 mo.	367,522	144,094	102,038	114,469	.....
Oct.	51,631	17,826	15,191	18,284	132,624
Nov.	46,483	15,419	13,463	17,372	138,461
Dec.	53,343	17,277	16,191	19,608	146,499
Total	518,979	194,616	146,883	169,732	.....
1953[3]					
Jan.	55,629	19,158	16,147	20,052	142,542
Feb.	54,864	17,583	16,698	20,272	148,557
Mar.	59,423	18,989	17,865	22,255	145,749
Apr.	61,582	20,009	18,583	22,620	141,231
May	57,602	19,600	16,479	21,208	138,037
June	56,820	19,330	15,535	21,675	136,437
July	51,653	16,664	15,733	18,915	126,426
Aug.	50,900	16,007	16,294	18,200	127,896
Sept.	54,002	17,818	17,523	18,245	122,949
9 mo.	502,475	165,158	150,857	183,442	.....

Copper-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Sand	Perm. Mold	Unfilled Orders[2]
1951	1,197,443	1,075,437	69,883	.....
1952[3]				
Sept.	85,815	78,278	4,680	89,034
9 mo.	745,570	672,260	47,621	.....
Oct.	93,102	84,544	5,518	86,779
Nov.	80,439	72,281	5,011	82,393
Dec.	90,799	81,777	5,715	76,871
Total	1,009,910	910,862	63,865	.....
1953[3]				
Jan.	85,781	76,686	5,388	80,793
Feb.	85,183	76,847	5,061	76,578
Mar.	92,798	83,639	5,716	69,490
Apr.	94,362	85,471	5,462	72,291
May	85,223	76,912	4,855	66,926
June	84,656	76,333	4,706	64,535
July	71,041	64,451	3,926	61,209
Aug.	78,357	70,557	4,890	63,419
Sept.	80,307	71,895	5,273	59,141
9 mo.	757,708	682,791	45,277	.....

Magnesium

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1951	30,825	28,090	.....
1952[3]			
Sept.	3,090	2,949	16,833
9 mo.	25,538	24,250	.....
Oct.	3,250	3,070	16,237
Nov.	2,959	2,785	17,053
Dec.	3,110	2,872	16,020
Total	34,857	32,977	.....
1953[3]			
Jan.	3,073	2,825	15,680
Feb.	3,225	3,033	14,834
Mar.	3,362	3,093	13,608
Apr.	3,294	3,046	12,709
May	2,679	2,434	13,635
June	3,136	2,666	13,664
July	2,372	2,084	13,840
Aug.	2,559	2,279	13,125
Sept.	2,524	2,236	12,454
9 mo.	26,224	23,696	.....

Foundry Production Workers

Estimated Number

(Thousands)

	Aug. 1953	July 1953	Aug. 1952
Ferrous	213.5	214.7	216.0
Nonferrous	77.6	79.6	72.5

Average Weekly Earnings

Gray Iron	$76.55	$77.52	$68.66
Malleable Iron	74.70	76.26	59.81
Steel	76.19	78.28	74.24
Nonferrous	78.99	80.59	74.06

Average Weekly Hours

Gray Iron	40.5	40.8	39.8
Malleable Iron	40.6	41.0	34.0
Steel	40.1	41.2	40.5
Nonferrous	40.7	40.7	40.1

Labor Turnover Rate (Aug.)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	5.3	4.4	2.6	1.0
Malleable Iron	4.2	8.0	2.8	4.2
Steel	2.3	5.8	2.5	2.8
Nonferrous	3.6	5.5	2.8	2.0

Source: Bureau of Labor Statistics

Gray Iron Castings—Shipments

(Net tons[1])

	All Castings—Total	All Castings—For Sale	Miscellaneous Castings—Total	Miscellaneous Castings—For Sale	Heavy Steel Ingot Molds—Total	Heavy Steel Ingot Molds—For Sale	Chilled Railroad Car Wheels—Total	Pressure Pipe & Fittings Total[4]	Soil Pipe & Fittings Total[4]	Unfilled Orders[3]
1951	14,988,555	8,453,048	9,573,347	4,471,539	2,614,517	1,257,542	639,996	1,473,192	687,503	.....
1952										
Sept.	1,119,373	629,708	676,732	309,299	230,219	107,987	39,912	107,847	64,663	1,450,723
9 mo.	9,424,564	5,470,014	5,971,463	2,833,254	1,528,893	732,552	414,670	1,001,035	483,034	.....
Oct.	1,233,480	688,837	759,131	340,695	243,462	117,255	45,664	117,089	68,134	1,391,609
Nov.	1,060,735	593,779	649,316	296,674	218,349	104,035	41,655	99,196	52,219	1,309,252
Dec.	1,141,658	619,070	713,332	321,939	247,605	116,410	42,957	95,198	42,566	1,316,308
Total	12,860,437	7,371,700	8,113,242	3,792,562	2,238,309	1,070,252	544,896	1,312,518	651,472	.....
1953										
Jan.	1,161,945	622,392	730,216	324,330	252,181	118,514	38,385	93,930	47,233	1,333,255
Feb.	1,135,868	607,160	721,847	315,101	228,360	106,398	44,420	93,152	48,089	1,332,038
Mar.	1,264,271	674,720	800,390	341,656	250,447	119,630	41,414	114,885	57,135	1,375,886
Apr.	1,277,288	683,047	799,872	329,802	246,873	122,702	44,877	120,105	65,561	1,305,849
May	1,185,545	641,581	734,326	312,836	238,202	115,728	41,373	113,136	58,508	1,271,711
June	1,196,106	648,400	743,737	312,681	232,596	115,946	45,542	114,118	60,113	1,245,904
July	1,056,422	573,280	752,371	274,890	212,187	106,526	36,715	97,739	57,410	1,232,651
Aug.	1,069,392	588,543	646,902	286,449	217,930	107,428	40,327	107,805	56,428	1,222,612
Sept.	1,102,653	611,905	666,296	289,909	232,055	117,694	37,055	108,270	58,977	1,170,191
9 mo.	10,449,490	5,651,028	6,595,957	2,697,654	2,110,831	1,030,566	370,108	963,140	509,454	.....

Steel Castings—Shipments

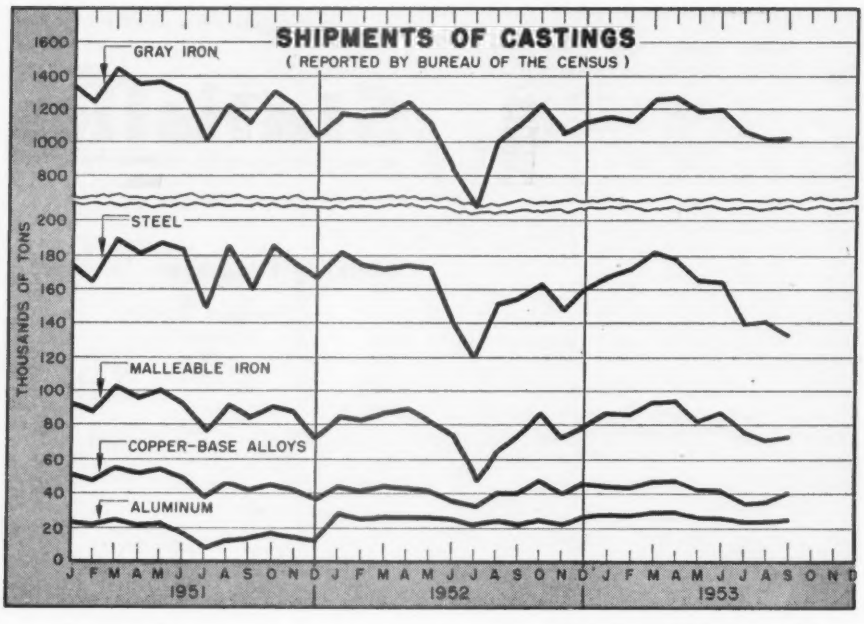
(Net tons[1])

	All Castings—Total	All Castings—For Sale	All Castings—Railway Specialties	Carbon Steel—Total	Carbon Steel—For Sale	Carbon Steel—Railway Specialties	Alloy Steel—Total	Alloy Steel—For Sale	Alloy Steel—Railway Specialties	Unfilled Orders[3]
1951	2,050,054	1,506,903	466,172	1,541,280	1,162,687	415,915	508,574	344,216	50,157	.....
1952										
Sept.	158,392	121,402	20,686	109,011	82,968	17,843	49,381	39,190	2,843	781,929
9 mo.	1,450,056	1,118,983	269,095	1,038,823	802,079	233,610	413,223	321,122	32,485	.....
Oct.	165,155	124,626	23,590	116,201	87,035	20,611	48,954	38,571	2,979	772,949
Nov.	148,259	110,467	23,148	105,314	77,979	20,681	42,945	33,349	2,467	751,687
Dec.	161,733	122,166	26,728	114,146	86,165	24,046	47,587	36,757	2,682	719,203
Total	1,925,203	1,476,242	339,561	1,372,494	1,053,264	298,948	552,709	430,429	40,613	.....
1953										
Jan.	167,211	126,819	27,150	118,423	118,423	24,788	48,788	38,121	2,362	706,490
Feb.	175,675	137,592	33,156	122,624	94,991	29,828	53,051	43,495	3,328	644,302
Mar.	182,181	141,873	34,364	129,055	100,069	31,772	53,126	42,286	2,592	634,600
Apr.	179,615	140,051	34,035	128,457	99,602	31,212	51,158	40,938	2,823	573,565
May	165,649	126,380	29,552	117,318	88,781	26,888	48,331	38,036	2,664	196,047
June	164,665	125,984	30,381	116,358	88,260	27,767	48,307	38,130	2,614	475,756
July	139,577	105,687	22,925	95,891	71,488	20,938	43,686	34,532	1,987	467,900
Aug.	141,340	107,941	25,026	97,076	73,784	22,637	44,264	35,003	2,389	418,927
Sept.	134,679	102,880	24,108	95,420	72,780	21,724	39,259	30,338	2,384	327,172
9 mo.	1,450,592	1,115,207	260,697	1,020,622	808,178	237,554	429,970	340,879	23,143	.....

[1] Source: Bureau of Census. [2] For sale only. [3] Based on new sampling method; not comparable to prior figures. [4] All cast iron pipe is shipped for sale.

(Concluded on page 144)

FOUNDRY STATISTICS (Concluded from page 143)



Index of Foundry Equipment Orders

Foundry Trades Only
(Net Orders Closed, New Equipment)

	1952	1953
Jan.	404.5	301.0
Feb.	200.4	257.3
Mar.	310.0	396.7
Apr.	385.1	303.0
May	225.2	294.4
June	353.8	446.8
July	343.9	440.8
Aug.	311.6	633.3
Sept.	365.9	317.2
Oct.	335.8	202.9
Nov.	258.1	....
Dec.	343.3	....

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Coke Production and Consumption

(Net tons)

	Production	Consumption Total	Consumption By Foundries
1951	79,133,744	78,868,124	3,664,404
1952			
Sept.	6,180,804	6,517,682	269,029
9 mo...	48,787,612	47,352,977	2,166,539
Oct.	6,449,519	6,792,273	276,427
Nov.	6,316,660	6,418,639	252,805
Dec	6,690,649	6,981,036	246,107
Total .	68,244,440	67,876,964	2,955,241
1953			
Jan.	6,767,814	6,884,585	248,557
Feb.	6,132,084	6,263,083	237,670
Mar.	6,835,310	6,875,568	275,442
Apr.	6,538,477	6,536,195	272,229
May	6,820,985	6,748,957	274,236
June	6,613,614	6,683,768	254,830
July	6,750,381	6,656,222	218,470
Aug.	6,724,779	6,591,879	237,612
Sept.	6,401,979	6,302,490	235,859
9 mo...	59,564,823	59,543,747	2,254,727

Ingot Brass & Bronze

(Shipments in net tons)

	1952	1953
Jan.	28,315	24,423
Feb.	24,211	25,429
Mar.	23,890	28,256
Apr.	22,547	25,044
May	21,740	21,660
June	21,274	20,818
July	18,947	19,321
Aug.	21,807	20,156
Sept.	22,770	21,463
Oct.	25,811	22,280
Nov.	23,441	.....
Dec.	22,983	.....
Total for year	277,736	.....

Zinc-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments—Totals	Shipments—For Sale	Unfilled Orders[2]
1951	478,996	324,964	.....
1952[3]			
Sept.	35,119	24,220	92,049
9 mo.	286,588	197,187	.....
12 mo.	408,353	282,673	.....
1953[3]			
Apr.	51,456	34,674	91,874
May	44,471	29,403	85,234
June	49,051	31,255	88,060
July	39,360	25,221	83,034
Aug.	38,214	24,230	77,895
Sept.	38,965	26,403	72,631
9 mo.	405,714	279,109	.....

Pig Iron Production and Consumption

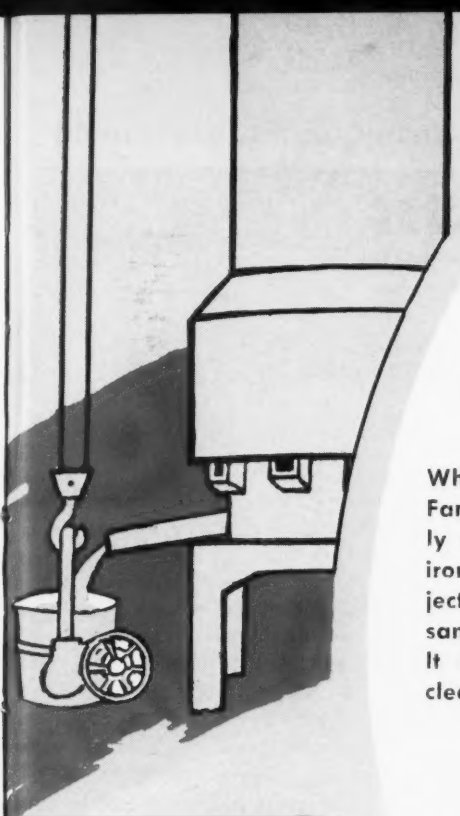
	Production** (Standard grades—1000 net tons) Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace, 1000 gross tons) Total	Cupola	Air	Electric
1951	70,264.5	3,186.2	3,169.0	55,134.1	8,774.8	63,760	5,731	354	136
1952									
Oct.	6,415.3	280.0	299.4	5,091.6	744.2	5,812	463	24	9
10 mo.	48,748.2	2,308.8	2,382.8	38,304.5	5,716.9	43,754	4,093	224	87
Nov.	6,138.9	262.0	315.4	4,842.6	718.8	5,472	397	21	12
Dec.	6,414.7	293.4	315.1	5,106.9	699.2	5,685	419	24	14
Total	61,306.8	2,864.2	3,013.3	48,254.0	7,174.9	54,911	4,909	269	113
1953									
Jan.	6,470.6	274.9	285.5	5,201.5	708.8	5,784	425	24	12
Feb.	5,802.6	187.0	294.6	4,640.7	680.3	5,027	418	24	14
Mar.	6,601.1	263.9	358.1	5,256.1	723.0	5,873	466	27	14
Apr.	6,161.6	244.7	327.1	4,885.6	704.2	5,568	478	28	12
May	6,508.5	210.0	347.7	5,237.0	713.8	5,844	436	24	14
June	6,288.0	201.6	313.4	5,075.0	698.0	5,581	437	24	12
July	6,425.9	213.5	344.4	5,145.1	722.9	5,580	367	20	15
Aug.	6,381.1	202.1	310.7	5,167.1	701.2	5,672	385	21	14
Sept.	6,121.4	209.4	310.4	4,927.0	674.5	.....	.....	.....	.....
Oct.	6,409.2	218.9	290.8	5,175.1	724.5	.....	.....	.....	.....
10 mo.	63,170.0	2,226.0	3,182.7	50,710.2	7,051.2	.....	.....	.....	.....

Iron and Steel Consumption

(Gross tons*)

	All Scrap—Total	All Scrap—Purchased	By Types of Furnace: Cupola—Total	Cupola—Purchased	Air—Total	Air—Purchased	Electric—Total	Electric—Purchased
1951	68,518,208	33,822,431	11,040,607	5,878,939	1,203,740	441,099	8,391,919	5,389,005
1952								
Aug.	5,470,696	2,738,593	721,255	348,181	74,351	28,091	682,405	446,543
8 mo.	37,536,375	18,733,270	6,006,496	3,141,059	699,225	261,787	4,899,817	3,133,638
Sept.	5,782,986	2,862,994	760,092	389,910	82,212	30,493	761,795	501,602
Oct.	6,256,031	3,066,041	851,458	439,401	98,947	37,743	814,565	546,189
Nov.	5,960,435	2,885,008	731,825	379,950	80,228	30,502	780,042	518,320
Dec.	6,089,722	2,973,633	804,275	412,177	92,621	35,064	758,845	491,084
Total	61,625,549	30,520,946	9,154,146	4,752,497	1,053,233	395,591	8,015,064	5,190,835
1953								
Jan.	6,256,718	3,061,551	810,254	413,971	95,430	35,695	795,292	517,963
Feb.	5,802,854	2,817,896	818,375	422,306	92,371	35,234	745,179	478,486
Mar.	6,536,867	3,211,476	901,786	464,110	103,034	38,583	857,760	563,489
Apr.	6,227,089	3,026,533	921,589	474,185	106,449	41,004	820,647	531,509
May	6,294,920	3,105,598	861,404	450,477	92,703	35,566	798,098	523,606
June	5,951,170	2,835,875	876,320	454,905	99,799	38,934	743,530	468,129
July	5,539,468	2,597,365	729,114	369,283	74,815	26,755	691,521	443,265
Aug.	5,637,759	2,614,153	753,272	390,741	77,047	28,167	678,968	428,332
8 mo.	48,246,845	23,270,447	6,672,114	3,439,978	741,648	289,938	6,130,995	3,954,777

*Source: U. S. Dept. of Interior, Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only. [3]Based on new sampling method; not comparable to prior figures.



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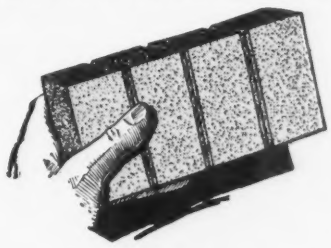
CLEAN IRON INSURES BETTER CASTINGS, INCREASED PRESTIGE AND LOWEST SCRAP LOSS.

Wherever its achievements are known, Famous Cornell Cupola Flux is constantly selected for the job of conditioning iron for the best castings. And the rejects averted have saved many thousands of dollars over its cost.

It not only does a thorough job of cleansing molten iron but desulphurizes it, makes it more fluid, and keeps slag fluid.

It brings you castings that are sounder, cleaner, tougher and easier to machine. MADE IN PRE-MEASURED SCORED BRICK FORM for easy, accurate use—and labor saving. It takes but a few seconds to flux each charge of iron and there is no waste.



pre-measured
SCORED BRICK FORM
(Approx. 4 lb. brick)

DO YOUR CUPOLAS LOOK LIKE

this OR this

THE CUPOLA before using Famous Cornell Cupola Flux.

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When you use Famous Cornell Cupola Flux, cupola maintenance is reduced amazingly. There is less digging out because drops are cleaner and bridging over is practically eliminated. There is less patching and repairing due to a glazed or vitrified protective surface which is formed on brick or stone.

Famous CORNELL CUPOLA FLUX

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FAMOUS CORNELL BRASS FLUX cleanses molten brass even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

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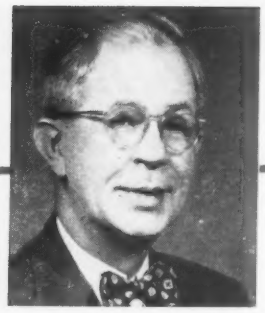
FAMOUS CORNELL ALUMINUM FLUX cleanses molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions. Dross contains no metal after this flux is used.



Man-to-Man

By RALPH L. LEE

Professional Foreman

"We all would like to feel there is a connection between the extent to which we give ourselves to our job and the recognition we receive"

YOU have every right to conclude that old Doc Lee has gone hog-wild on this leadership and supervisory business (this being the third article on the subject), but there's another angle I've just got to spew forth on, an all-fired important one that I've been researching for many a year.

Surely there is no phase of the foundry business which has so much to do with the color of the ink on our books as the kind and quality of supervision we provide the folks who turn out the stuff we're in business to produce. Besides, the first of the year is the traditional time when new viewpoints are in order.

The Big Step—I think we'll all have to agree that the step from the machine, bench, floor or desk to bossship is by far the biggest we ever take, no matter how far we travel later. And having had the experience, we also will have to agree that we had our hands full at first trying to get the hang of things on the new job, with our minds well occupied for quite a spell.

But we know that after a while, most foreman internes begin to get the hang of things, to get the lay of the land and, with assurances from their bosses, to settle down for the long stretch. From there on it doesn't take too long for the glitter of the new badge to wear off and for its owner to discover that the principal ingredient in his new job is trouble, of just about every kind and breed possible, in his department and with his crew.

If he has the right kind of a superintendent to report to, he gets help, encouragement and maybe a pat on the back. Then if the policies of his management are wise, he gets a raise now and then to kind of egg him on. According to the copybook, that's the way it should be. But, unfortunately, there are outfits where the folks who have the say-so are so loaded down and swamped by one crisis after another that the matter of raises, earned and deserved, slips their minds, along with other forms of recognition and compensation.

Cause for Wonder—Now let us say that under conditions like these a newly made foreman, putting everything he's got into his job, keeps peeping expectantly into the old pay envelope for some tangible evidence that he is making the grade. He wonders what is what, keeps peeping and then, with little doubt that an earned raise is long overdue, he is finally forced, much against his natural inclination, to ask for consideration.

Let's say he gets it, with no argument and even an apology. He is grateful, of course, but he can't help feeling that maybe he is being taken for granted and that the raise he got, when he got it, was not as closely connected with the effort he put forth as it should be to serve as a reliable incentive for still greater effort, judgment and ingenuity.

Under these circumstances he begins to wonder just how much wrestling he's going to have to do in the future to get his just due, let alone a little more. If on top of this fret, he sees promotions made among fellow supervisors who do not seem to measure up to his standards, or at least promotions he can't quite understand, he is likely to begin to suspect that recognition and progress in his company is as much a matter of getting the breaks as it is that of investing sincere and conscientious effort in the daily grind.

This suspicion would naturally lead to another that favoritism enters the picture, as well as politics and the possibility that the moods, frames of mind, personal likes and dislikes and hunches of the powers that be had more to do with his getting ahead than anything he himself could do about the matter.

It Does Happen—Don't think for one moment that I have pulled this possibility out of the air to make a story or a point, for I haven't. I found this situation in full bloom and on a wide scale in any number of specific organizations which called me in for counsel. I suspect that this condition is not what you'd call rare right now in many foundries.

On the other hand, I'm sure we all can agree that no matter how carefully promotions are made, how regularly and equitably earned recognition is granted, there always will be the real problem of trying to explain such moves to those who feel they are more deserving. But granting that this problem will always be with us, we've got to face the fact that we cannot expect our front-line supervisors to put forth their very best efforts on the basis of a gamble with the dice loaded and with combinations of circumstance, whim, memory and personal biases determining their rewards.

I think we all can agree that in most foundry organizations there is not a sufficient number of possible promotions in prospect for all of our supervisors to serve as satisfactory incentives for them to extend themselves as much as they should to get the most and the best from their respective crews.

This being the case, there ought to be some way to make the occupation of foremanship or supervision sufficiently attractive itself to justify a man's choosing it as a lifetime career in which he can distinguish himself through his own efforts, without taking one step

(*Concluded on page* 148)

pioneering developments keep WHEELABRATOR *first in blast cleaning*

Replaces 12 Machines—Saves 56 Man-hours Daily

Returns Entire Investment Within One Year At The Fate-Root-Heath Company

Another typical example of the cost-and-time-saving performance of Wheelabrator airless blast cleaning equipment is this gray iron foundry installation at The Fate-Root-Heath Company. One Wheelabrator Tumblast replaced 12 tumbling mills formerly used for cleaning gray iron castings weighing up to 400 lbs. each. 500 pound loads of castings are cleaned in from 3 to 5 minutes, and the castings are so clean they "look as if they had been painted with aluminum paint."

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Operating costs are extremely low and recently they have been further reduced through the use of Wheelabrator Steel Shot in the machine. Switching to this superior electric furnace steel shot resulted in a 600% increase in parts life and greatly improved overall cleaning results.

Why pay a premium for inferior methods of cleaning when an airless Wheelabrator will clean your work faster, more thoroughly, at lower cost?

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WORLD'S LARGEST BUILDERS OF AIRLESS BLAST CLEANING

(*Concluded from page* 146)

further up the organizational ladder.

This is quite a contract, but it can be done, and I say this because it has been done and is now being done. Certainly the strategic post the line supervisor holds, the value of his efforts and the ends to which we have gone in training him for his work definitely prove the need for fulfilling this contract.

It Takes Incentive—After all, the foreman is no separate species; he is no different from the rest of us. No matter what our jobs are, we all would like to feel that there definitely is a connection between the extent to which we give ourselves to our jobs and the recognition and compensation we receive. We can't go all-out in the face of evidence, or even of the suspicion, that rewards are largely a matter of the breaks or of personal hunches and opinions.

All of us would like to be recognized on the basis of the record, and in the case of the front-line supervisor there usually is a record, down in black and white, although this record is rarely thought of in this connection.

Here are some of the items about which every foundry should keep records—and many do:

Employee turnover
Absenteeism
Punctuality
Accidents
Grievances
Scrap
Tool breakage
Production costs
Production
Housekeeping
Records
Reports

There are probably more items available to almost any organization, but these are enough to suggest what I have in mind. Each of these items, without much imagination or ingenuity can serve as a pretty good index of one phase of the supervisor's batting average. When they are used in different combinations, I doubt that any quality or quantity of his performance could escape evaluation.

Although it is true that certain items would have to be weighted to allow for peculiarities in each department or acts of God in one form or the other, the list as a whole, plus other items which might suggest themselves, can serve as an explainable and acceptable basis for promotion and for other forms of selective recognition.

We'll have to admit that even the best we can do with such information will be far from being foolproof, but even at its worst it will be so much better than rough approximations in the cluttered minds of overworked brass working under stress that there will be no comparison. Then, too, with such data down in black and white, we certainly could do a much better job of explaining what we do both to the one who gains and the one who doesn't.

So here's the thought for the day. As regularly as clockwork, come rain or shine, come hell or high water, let us, at least once a month, take the written record of each supervisor (and others maybe) and do our level best to analyze his supervisory batting average. We can hardly do this without automatically setting up some kind of a score which can be compared with others and explained if need be, even though the score does not appear as such on paper.

When it becomes breezed about that some such routine is the basis upon which every form of recognition is granted and when from actual experience it becomes a fact that recognition will be granted, the supervisory force will take a new lease on life, along with all its followers.

Then if it also gets breezed about that the ceiling for supervisors' take-home pay is quite flexible under the pressure of outstanding performance records, the chances are 10 to 1 that an increasing number of our supervisors will choose their occupation as their life's work. This ought to work in a one-foreman shop, too. I'm going to try it up in the Lee Hobby Foundry.

"Who, me? I'm stalled—Could you give me a little push?"

Book Review

Metallurgical Dictionary, by J. G. Henderson, assisted by J. M. Bates, cloth, 396 pages, 6 x 9 in., published by Reinhold Publishing Corp., New York. Price $8.50.

Semiencyclopedic in nature, this reference book contains over 5000 definitions and descriptions covering all of the most essential terms in both production and physical metallurgy. Its sole purpose is to provide a comprehensive, easily used, up-to-date working tool for all persons who manufacture or use metals and metal products.

Care has been taken to cross-reference entries of related terms, not only to facilitate reference to compound terms, but also to direct the user from a synonym to a preferred term and to offer him a full coverage of available information.

CONTROL

RAISES QUALITY... CUTS COSTS

At E • Long Ltd., Orillia, Ontario, a Model "60" Speedmullor mulls 120 tons of synthetic molding sand to exact physical properties each day. Mulltrolmatic precisely controls the 80 second total mulling and cooling cycle.

MULLTROLMATIC CALLS SIGNALS FOR SPEEDMULLOR AT E • LONG LTD.

Control often spells the difference between a profitable and an unprofitable foundry operation. No foundry can afford to disregard the advantages of controlled operations.

1 The product is more uniform . . . high quality may be maintained continuously.

2 Controlled uniformity permits a substantial reduction in material costs.

3 Controls take over and permit essential manpower to be relieved for other jobs.

4 The equipment is operated correctly *all* of the time. Human elements of error are eliminated.

These are but a few of the benefits. Write now for full information to *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Illinois.*

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BEARDSLEY & PIPER
FOR BETTER METHODS

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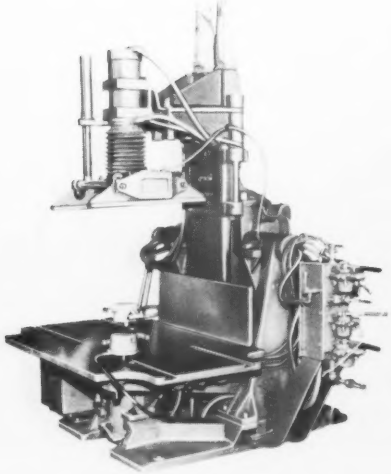
The foundry has standardized on 24 x 30 inch flasks for side floor work. For copes—a J&J 68 SP with 25 x 30 inch table and 600 lb. capacity. For drags a J&J 612 RPB with 24 x 30 inch table and 600 lb. capacity.

The industrial stokers and special heating equipment produced by Babcock-Wilcox at their Galt, Ontario, plant require many top quality castings. That's why B-W depend on B&P - J&J molding machines for the major portion of their molding.

These machines have been doing a highly satisfactory job for many years. Newer J&J machines have many added features. The J&J 920 RB, shown below, features an automatic adjustable flask equalizer and an automatic pattern board clamp. Write now for full information to *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Illinois.*



Most of the foundry's large work is handled on a J&J 920 RC. Molds weighing up to 2500 lbs. are rammed. Flasks up to 45 x 60 inches are handled.

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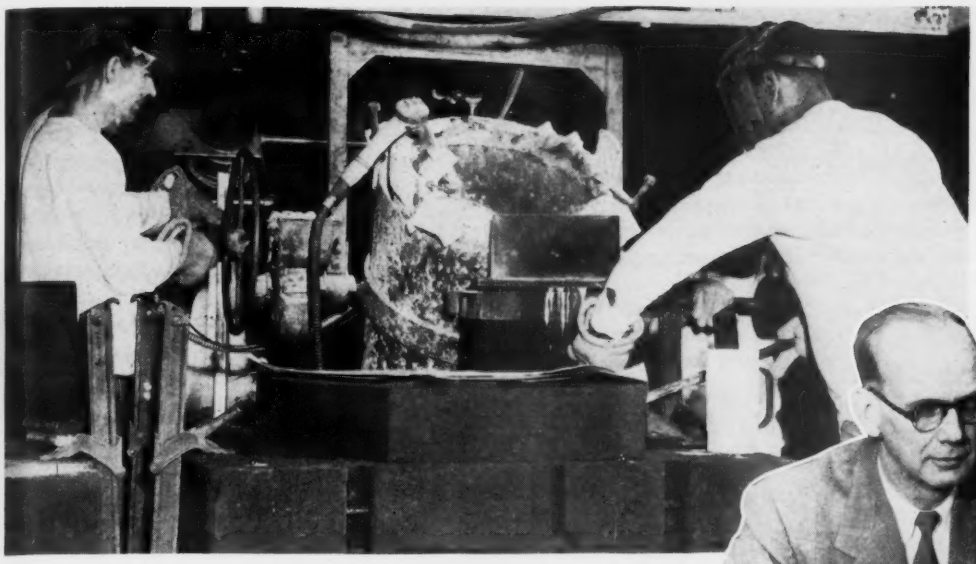


Pouring magnesium castings for the first model turbojet engine at the foundry of the Ford Motor Co.'s Aircraft Engine Division in Chicago

Clifford L. Wheeler, left, manager of the Ford Aircraft Engine Division foundry, and H. L. Minkler, his management assistant, study blueprints as work on jet castings gets under way

By ERLE F. ROSS
Chicago Editor

Ford Prepares To Push

PRODUCTION OF TURBOJETS

AIRCRAFT Engine Division of Ford Motor Co., Chicago, recently completed its first Pratt & Whitney J-57 turbojet engine and gave it a test run. With the tests described as completely satisfactory, the huge plant redoubled its efforts toward assembly line production, scheduled to start early in 1954.

Shortly after the first engine was completed, top officials of Ford and Pratt & Whitney and officers of the Air Force made a tour and inspection of the plant.

No sooner had the first engine been completed when assembly operations were launched on a second. Actual production engines will be turned out as soon as tests are complete on the engineering models. In the meantime, banks of magnesium castings and other components are being built up, and machining is being converted from pilot to production run basis. The foundry is well under way on its output program.

The powerful J-57 turbojet has an official rating in the 10,000-pound thrust class. This places it in the category of being the most powerful aircraft engine ever produced. It also has the lowest specific fuel consumption of any turbojet engine presently in production for the Air Force, plus a rapid rate of acceleration.

Pratt & Whitney Division of United Aircraft Corp., which developed the engine, believes that the J-57 is at least two years in advance of any other engine known in the turbojet field. This includes British as well as American jet engines.

The engine has been produced by Pratt & Whitney since last February. Ford Aircraft Engine Division is building it for the U. S. Air Force

Ernest R. Breech, Ford executive vice president, Henry Ford II, president, and John Dykstra, vice president, inspect the first J-57 turbojet engine

under a license agreement with Pratt & Whitney.

The J-57 powers the Air Force's new heavy jet bomber, the Boeing B-52 Stratofortress, and the Air Force's new supersonic fighters—the North American F-100 Super Sabre, and the Convair F-102. Early in December it was announced that the J-57 has been officially designated to power two more types of planes—the Douglas-built F4D Skyray and the A3D, both Navy planes. The engine also is slated to be used on the McDonnell F-101.

The Boeing B-52, which made its first flight April 15, 1952, was equipped with pre-production engines built at Pratt & Whitney's East Hartford, Conn., plant. The North American F-100, the first fighter scheduled for operational use to fly faster than the speed of sound in level flight, first flew May 25. The F-100 is powered by a J-57 engine with an afterburner, which increases the basic engine's power. The Convair F-102 first flew Oct. 24. A production model of the Douglas A3D, a twin-engine, high-speed bomber, has made its initial test flight and it is said to be the first production plane to fly with production J-57 engines.

Ford Aircraft Engine Division is the former Dodge Chicago plant operated by Chrysler Corp. during World War II. It was reactivated by the government in October, 1950, to manufacture the Pratt & Whitney R-4360 piston-type Wasp-Major engine but that program is now being phased out. Ford shipped its one-thousandth R-4360 engine in August.

In addition to producing its own requirements for magnesium castings, the aircraft Engine Division foundry produces castings for several other aircraft users. Some of the latter are increasing their orders for castings. For some time the foundry has been meeting its production schedules.

Indicative of the activity which is going on at Ford Aircraft Engine Division, new employees still are being sought in certain skills and work categories.

Chicago Foundrymen Meet To Elect Officers

Carl A. Larson, partner, Reliance Pattern Works, Chicago, was elected president of the Chicago Foundrymen's Association at its annual meeting on Nov. 19. Reliance Pattern Works engages in making wood and metal pattern equipment and also operates an aluminum foundry.

R. F. Grover, president, Love Bros. Inc., Aurora, Ill., was re-elected vice president. C. V. Adams, works manager, Vulcan Iron Works Inc., Chicago, was re-elected secretary-treasurer, and Joseph Vilbig, president and treasurer, Fox Valley Foundry Co., Aurora, was named a director. Mildred Kosar continues as executive secretary, at 343 South Dearborn St., Chicago 4.

Centrifugal Casting Creates New Product

Booklet just released by Electric Steel Foundry Co., Portland, Oreg., describes products and applications of centrifugally cast heavy wall cylindrical stock, tubes and IPS pipe manufactured as ESCO Spuncast. Essentially a new raw material, it is said to be a form for stainless and high-alloy steels and other metals which offers new possibilities for reducing production costs of hollow, circular or cylindrically shaped parts and products.

Book Review

FBI Register of British Manufacturers—1954, 26th Ed., cloth, 952 pages, 7½ x 9½ in., published by Kelly's Directories Ltd. and Iliffe & Sons Ltd., London, for the Federation of British Industries. Price 42s.

A standard export reference book to British industry, this volume classifies over 6500 Federation of British Industries member firms under more than 5000 alphabetical trade headings. Full details about these firms are included in a comprehensive alphabetical directory. Other sections provide useful information about trade associations, proprietary names, trademarks and other matters. The book is divided into seven sections.

Introductory information and detailed instructions on the use of the register are translated into French and Spanish.

FOUNDRY EXHIBITS: Here are several of the many booths conducted by foundries during the 35th National Metal Exposition in Cleveland. A wide variety of ferrous and nonferrous castings was shown.

*DIXIE BOND

The strongest bond clay ever offered American Foundrymen. Moderate dry and hot strength mean easy shake-out and better flowability.

*TRIPLACT

Additive to core and molding sand; reduces scabbing, stops veins and fins in cores, improves finish; imparts higher flowability.

WESTONITE

Versatile chemically coated sand for green sand, skin-dried or dry sand molding. Maximum production, best finish, fewer types of sand needed.

*BLACK HILLS BENTONITE

Highest quality Wyoming bentonite of controlled uniformity. High green strength, high permeability, high dry and hot strength.

REVIVO FIRE CLAY, LAWCO FIRE CLAY, BONDACT FIRE CLAY

Found only in the Lawrence seam in Southern Ohio. Uniformly high refractory value. Use Revivo Fire Clay for highest plasticity, Lawco Fire Clay for general purposes and Bondact Fire Clay for mixes for gun emplacement.

ECP products satisfy a wide range of foundry needs

CUPOLINE

Pre-mixed refractory for patching cupolas by air placement. Eliminates human equation. Produces uniform, dense patch of maximum slag resistance at lower cost.

*REVIVO

Strong, refractory, durable and economical. Unusually high colloidal content. Since 1923, the standard of comparison for refractory bond clays.

ECP Bond Clays and many combinations give you the one right answer for every purpose.

*BALANCED REVIVO

Extremely high dry and hot strength. Thermoplastic, gives toughness at high temperatures. Helps eliminate washing and scabbing.

DURA PRODUCTS

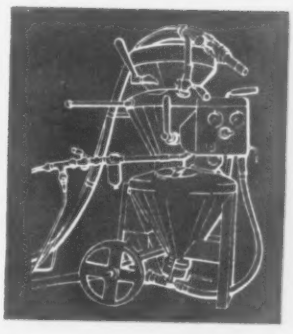
Plastic blow tubes, wear inserts and core box gaskets. Life many times that of metal. Cleaner, smoother cores, higher production, less maintenance.

*REVIVO CORE PASTE

Astonishing strength—35% to 300% stronger than competitive materials. It may be air-dried or oven-dried. Non-boiling.

BONDACTOR

For fast mechanical ramming of refractory linings and patches. Meters a dry refractory mix uniformly. Less bridging, longer heats, more tonnage, cleaner metal from Bondactor-patched cupolas. Saves hard manual labor and reduces costs. →



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EASTERN CLAY PRODUCTS *Department*

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6

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GREEN-X SUPER DUTY GRAPHITE-TYPE PLASTIC REFRACTORY

A. P. Green REFRACTORY PRODUCTS

PROVED ON-THE-JOB TO GIVE YOU 6 ADVANTAGES

More tonnage per lining . . . made from the finest quality super duty fire clay.	1
Easier cleaning with less damage to the lining . . . less adhesion of slag and skull to the lining.	2
Reduces erosion of molten metal . . . develops strong bond throughout entire thickness.	3
Metals flow more easily through troughs and pouring spouts . . scientifically incorporated graphite has lubricating effect.	4
Provides cleaner metal and more perfect castings . . . successfully resists the attack of molten metal and slag.	5
Fewer laminations and less tendency toward shrinkage.	6

GREEN-X—
scientifically developed for long life in lining

Forehearth or Holding Ladles

Bull Ladles

Pouring Ladles

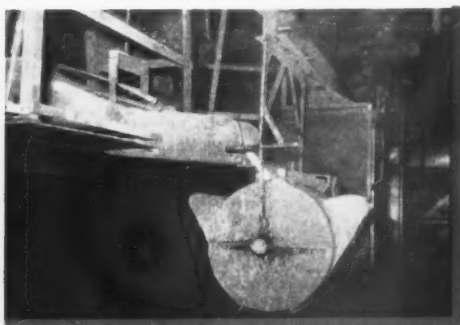
Hand Ladles

Cupola Wells

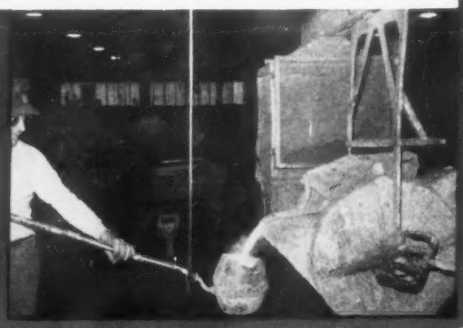
Cupola Slag Holes

Malleable Furnace —runners & spouts

Cupola —runners & spouts



1400-lb. capacity transportation ladle and cupola trough lined with Green-X.



Transportation ladle and pouring ladle are both lined with Green-X for longer life and cleaner metal.

Green-X is pre-sliced and conveniently packaged in 100-lb. waterproof cartons . . . designed for easy handling.

WAREHOUSE STOCKS FOR PROMPT DELIVERY

Look in the classified section of the telephone directory or write direct for the name of the A. P. Green distributor in your locality. He has complete stocks and can make prompt delivery.

A. P. GREEN FIRE BRICK CO.

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In Canada
A. P. Green Fire Brick Co., Ltd.
Toronto 15, Ontario

DISTRIBUTORS IN THE PRINCIPAL CITIES OF THE WORLD

Industry Briefs

RAJAC Equipment Sales Corp., 4718 West Touhy Ave., Lincolnwood, Ill., organized recently by R. G. Pence and J. W. Cleveland for sales of foundry equipment, has been appointed to represent Whirl-Air Flow Division of Gerwin Industries Inc., Michigan City, Ind., in sale of its new pipeline pneumatic sand conveyor system. Territory covers Illinois, Indiana, Michigan, Wisconsin and Ohio.

* * *

Lamson Corp., Syracuse, N. Y., has acquired the fork lift truck business of Mobilift Corp., Portland, Oreg. Assets acquired include all equipment, machinery and inventory at the manufacturing plants in Portland and at the five sales, service and parts branches in Berkeley, Calif., Dallas, Tex., Chicago, Atlanta, and Rutherford, N. J.

* * *

Clark Equipment Co., Buchanan, Mich., manufacturer of materials handling equipment, has established a low cost equipment leasing program to operate through its dealers on a national basis. It is being offered as a service to industry which has need of such an arrangement, not as a preference to outright purchase.

* * *

Baltimore Alloy Foundry Inc., 1212 Edythe St., Baltimore 2, began operations Nov. 30. Initial investment was $15,000. President John N. Matricciani formerly was president of Ajax Alloy Foundry Inc., Baltimore, which he started in 1946.

* * *

Chicago Tramrail Corp., Chicago, has purchased a half-acre tract on Kostner near Fourteenth, in Chicago, from W. A. Jones Foundry & Machine Co. for about $20,000. Tramrail plans to build a 12,000-sq ft plant on the site.

* * *

Deliveries of 8727 new domestic freight cars in October set a new high for 1953. Railroads placed orders for 1705 freight cars in October, and the backlog of cars on order as of Nov. 1 was 35,171.

* * *

Plamondon Magnetics Co. has been organized in Chicago, with offices and factory at 1850 Hubbard St., by A. D. Plamondon Jr., former president of Indiana Steel Products Co., Valparaiso, Ind. Mr. Plamondon is president, and his son, A. D. Plamondon III, is vice president. The firm will produce magnetic parts for the electronics industry.

* * *

Monsanto Chemical Co. has purchased the Russell Ave. foundry properties and a machine shop of American Car & Foundry Co. in St. Louis for about $400,000. The foundry has been leased to American Car, which will continue its operation. Monsanto already owned ground on three sides of the plant.

* * *

Donegal Mfg. Co., Marietta, Pa., is producing corrosion resistant DC-50 castings under a license agreement with Armco Steel Co. Essentially the same as the Armco 17-PH hardenable stainless alloy, the new alloy has a minimum tensile strength of 180,000 psi and a minimum yield strength of 165,000 psi.

* * *

S. & C. Aluminum Foundry has moved from its location at 1500 North Sandusky Ave., Bucyrus, O., to larger quarters in the same city.

* * *

Products Research Inc. has been formed in the Milwaukee suburb of Butler to manufacture shell molds and machinery and to operate as a foundry. Incorporation papers were signed by Al Nelson, Erwin H. Baethke, Thomas A. Bayevich and by the registered agent for the corporation, Frank Bayevich. All are of Milwaukee.

* * *

Zirconium Corp. of America has been formed, with general offices in the Solon Center Building, Solon, O., to manufacture various zirconium compounds, particularly zirconium oxide. Officers are George R. Sylvester, president; Dr. Robert A. Schoenlaub, vice president; Guthrie Bicknell, vice president; and Norton V. Coyle, secretary.

* * *

Foundry Services Inc. has moved its main office from 280 Madison Ave., New York, to larger quarters at 260 Madison Ave., New York 16. The firm specializes in the manufacture of metallurgical compounds used by foundries.

* * *

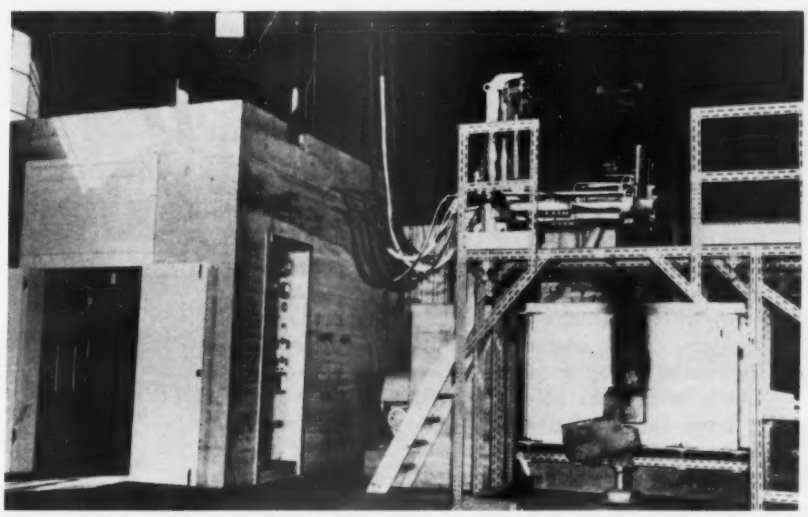
Dravo Corp., Pittsburgh, has located its Washington office at 48 Court St. (mail address is P. O. Box 204), Ellicott City, Md., to provide a central location for service to customers in Baltimore, Washington and the surrounding area.

* * *

Peerless Aluminum Foundry, 42 Andover St., Bridgeport, Conn., is building a $15,985 addition.

* * *

Fall River Foundry Co. has been formed in Milwaukee with authorized capital stock of 1000 shares of common of no-par value. Incorporation papers were signed by Harry L. Wal-



FURNACE AIDS CANADIAN DEVELOPMENT: Lectromelt Furnaces of Canada recently completed installation of this 200 kva arc furnace in an Ottawa laboratory of the Division of Mineral Dressing and Process Metallurgy of the Department of Mines and Technical Surveys in Canada. The purpose of the division is to investigate methods of processing Canadian minerals and metals as efficiently and economically as possible

lace, 2567 North Cramer St., Milwaukee 11. P. J. Berner, 2371 North 30th St., Milwaukee 10, is registered agent.

* * *

Buckeye Tools Corp., Dayton, O., has appointed two new sales representative organizations. Standard Products Inc., 650 East Gilbert St., Wichita, Kans., will serve western Kansas, and Sooner Industrial Supply Co., 314 East Second St., Tulsa, Okla., which previously served Oklahoma, has been assigned Arkansas.

* * *

Richfield Foundry Corp. has been formed in Richfield, Wis., with authorized capital stock of 1250 shares of common of no par value. Incorporation papers were signed by Walter and Mildred Tomsyck, 538 North 119th St., Milwaukee 13.

* * *

William J. Bennett, vice president, secretary and treasurer of Buckeye Steel Castings Co., Columbus, O., was presented with a 50-year button and a certificate at the company's ninth annual Twenty-Five Year Club meeting recently. Mr. Bennett completed 50 years of service last May.

* * *

American Machine & Foundry Co. will consolidate its New York offices, now in three Manhattan locations, in a 28-story, fully air conditioned office nearing completion at 261 Madison Ave., New York. The move is expected to take place about Feb. 1.

* * *

Grede Foundries Inc. has completed an extensive remodeling program at its office building, 1320 South First St., Milwaukee, including installation of a year-round heating and air conditioning system and other changes.

* * *

Dewalt Inc., Lancaster, Pa., has formed a Canadian subsidiary called Dewalt Canada Ltd., at 50 Crimea St., Guelph, Ont. Dewalt Inc. is itself a subsidiary of American Machine & Foundry Co., New York.

Michigan Tool Co., Detroit and Traverse City, Mich., is negotiating for the purchase of the physical assets of Manistee Iron Works, Manistee, Mich. At present, Michigan Tool is operating the Manistee plant as the lessee.

* * *

Foxboro Co., Foxboro, Mass., manufacturer of industrial instruments for measurement and control, has opened a branch office at 1117 La Paloma St., Amarillo, Tex. D. T. McElligott, formerly in the Dallas, Tex., office, is resident engineer.

* * *

Marlboro Foundry Co., will produce bronze castings at a new plant now nearing completion on Maple St., Marlboro, Mass. Howard B. Nye and Leo A. LaVigne are the incorporators.

* * *

Materials Handling Division, Magnesium Co. of America, East Chicago, Ind., has appointed F. E. Bennett Co., Portland, Oreg., sales representative in Oregon.

How To Do It . . .

Jig Holds Castings in Automatic Grinding Machine Operation

By ROBERT H. HERRMANN
Associate Editor

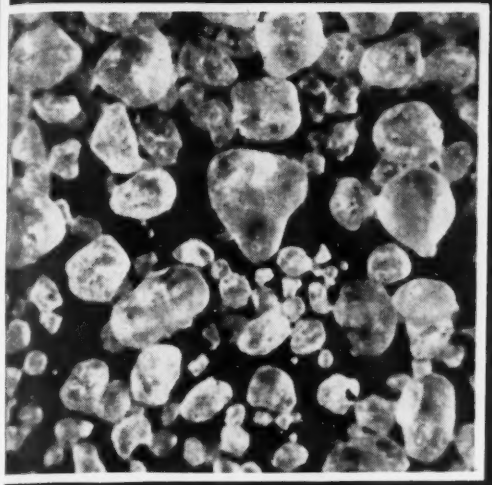
GRAY IRON valve stem guide castings are ground at International Harvester Co., Indianapolis, at the rate of 3400 per hour in a specially designed machine. The cylindrical shaped castings are $\frac{5}{8}$-in. diam by 4 in. long, and the end which was attached to the gate is ground off. The grinding machine makes use of a horizontally rotating steel table on top of which is mounted a jig about $3\frac{3}{4}$-in. thick with vertical slots cut into the peripheral edge at uniform centers. The castings are placed by hand into the slots where they are held in place by a steel plate curved at a radius slightly greater than that of the rotating table.

A 16-in.-diam resin bonded grinding wheel which rotates in a vertical plane 180 degrees from the point where castings are fed to the machine, grinds the tops of the castings as they are carried by on the table. The grinding wheel has a 3-in. face which is tapered 10 degrees, and castings contact it from the smaller diameter edge. The wheel is operated at maximum permissible speed for its size and type and is worn to approximately 11 in. diam, then discarded. It is equipped with an exhaust hood and is adjustable vertically and horizontally to compensate for wear and also to accommodate other castings which may be ground in the machine. The jig bolted to the rotating table is removable so that others, properly slotted to take different castings, may be inserted.

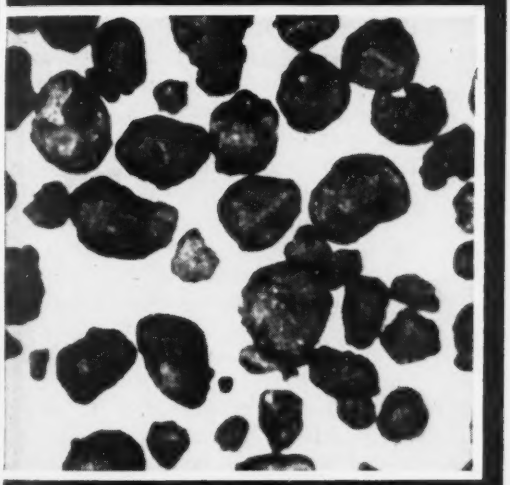
The curved steel plate holding the castings in the slots terminates just beyond the grinding wheel, and the castings, which extend slightly above the jig top, are pushed out of the slots by a stationary cam into a chute, which guides them into a skid box for subsequent removal by industrial truck.

This special automatic machine was developed by William Fitzsimmons, mill room superintendent, and Al Lee, general foreman, together with the plant engineering department.

Do you have any tricks of the trade tucked away with your foundry experience: Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $15 for each idea submitted and published. Send a photo or drawing with your idea



1. New sand—This is an Ottawa sand



2. Discarded sand

3. Sand reclaimed by Hydro-Blast method. Minute carbonaceous deposits represent coverage of a small percentage of grain surface; therefore do not detract from the physical characteristics of the sand.

Sand Reclaimed BY HYDRO-BLAST

is Better than new sand!

- **Laboratory photomicrographs prove what astute foundrymen already know from first-hand experience**
- **better surface finish on castings**
- **sharply lower costs of cleaning**
- **big cuts in costs of sand and sand transport —these potent benefits are reported by the many foundries employing the Hydro-Blast method of sand reclamation. No exceptions!**

It's no wonder Hydro-Blast is used in most of the leading iron and steel foundries in the U.S. and Canada.

To estimate how much you can save annually by using Hydro-Blast for sand reclamation, use a simple, self-survey form we've prepared for the purpose. You'll get a startling message, dictated by your own sand consumption and cost figures. Write us for Self-Survey Form S-200.

HYDRO-BLAST Corporation

2550 NORTH WESTERN AVENUE
CHICAGO 47, ILLINOIS

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION MEMBER FEMA

Around the Country

NEWS REPORTS FROM

- Cleveland
- Los Angeles
- Chicago
- Philadelphia
- New York

Cleveland

EIGHTH Annual Technical and Operating Conference of the Steel Founders' Society of America, held on Nov. 4, 5, and 6 at the Carter Hotel, Cleveland, was acclaimed as being the most successful ever held, as attested to by record-breaking attendance of 591 people representing 133 foundries.

Technical sessions on "Quality Improvement in the Steel Foundry," "Green Sand Practices," "Scientific Approach to Gating and Risering," "Hot Tears," and "Preventive Maintenance in the Steel Foundry" were held during the three-day period. The intense interest of the steel foundrymen in these sessions was illustrated by the presence of approximately 400 people at a single session at one time.

Credit for success of the conference goes to the efforts of the society's Technical and Operating Committee under the chairmanship of R. C. Wood, Minneapolis Electric Steel Castings Co. and composed of: Earl Blanton, Atlantic Steel Castings Co.; J. H. Janssen, Pratt & Letchworth Co. Inc.; T. W. Peacock, Florida Machine & Foundry Co.; I. W. Sharp, American Steel Foundries; Frank Kiper, Ohio Steel Foundry Co.; C. F. Haertel, the Falk Corp.; R. L. Jones, American Steel Foundries; B. G. Emmett, Los Angeles Steel Casting Co.; A. Finlayson, Pacific Car & Foundry Co.; R. L. Gilmore, Superior Steel & Malleable Castings Co.

Los Angeles

FOUNDRY activity is waning. Bookings of gray iron foundries serving the building and agriculture industries are off 10 to 15 per cent and backlogs are scant. Backlogs of foundries supplying the petroleum industry needs are 30 to 60 days in length but are 40 per cent less than six months ago.

Prospects for the oil industry are good. California oil well drillers have drilled 5 per cent more wells so far this year than last and the drilling rate is rising.

Local trade experts expect sales volumes of most foundries to slump at least 10 per cent in 1954. Most optimistic guesses of some operators place the new year's activity at "about the same as last year."

The recent furor in Los Angeles over smog, which included suggestions for relocation of entire industries and new methods for making gasoline, has subsided somewhat. The appointment of the governor's commission to establish a Technical Commission will result in specific recommendations regarding the progress of controlling smog by the Air Pollution Control District. When the Commission makes its report more fireworks are anticipated.

Chicago

IN VIEWING new products, foundrymen naturally show a special interest as to the possibilities presented for use of castings. Intriguing, therefore, from the angle of castings incorporated in the design and overall sales potential is a new, small, unconventional riding tractor Sears, Roebuck & Co., Chicago, is introducing in its 1954 spring general catalog and selected retail stores during January.

Called the Tri-Trac because of its unique three-wheel construction — two small wheels in front and a larger driving wheel in the rear— the David Bradley riding tractor has been planned especially for full or part-time farmers with working areas up to 30 acres, the professional gardener, the estate owner and institution. The new power unit, which has a Wisconsin 6.2-hp air-cooled engine, is being introduced following five years of tests and a development cost of half a million dollars. It will sell for $598 f.o.b. factory by catalog or $649 at retail stores. The least expensive conventional small riding tractor now on the market sells for $1000 or more. Available at extra cost are 12 implements for all kinds of crop work.

Company officials explain that the Tri-Trac is the latest in a series of equipment to be developed by the company especially for the growing class of "sundown" or part-time farmers. This category includes over 2 million families who live on acreages ranging in size from 3 to 30 acres in suburban communities and on the outskirts of large cities.

As to castings utilized, consider that of the 894 lb shipping weight, including the engine, 245 lb are castings—228 lb of gray iron and 17 lb of malleable iron. This is over one-fourth of total weight. Of the gray iron the engine takes 57 lb, gear cases 58, belt pulleys 40, wheel hubs 64 and miscellaneous 9 lb. Then add to this 203 lb for wheel weights.

Implements designed for use with the tractor also use castings liberally. For example, the mower has 32 lb of gray iron and 39 lb of malleable; the plow 10 lb gray iron and 1 lb malleable; cultivator 6 lb gray iron and 36 lb malleable; middle buster 3 lb gray iron and 10 lb malleable, and dump rake 13 lb gray iron. It is estimated that the average sale of tractor and several implements will account for about 464 lb of gray iron and 70 lb of malleable iron castings.

The tractor will be manufactured by David Bradley Mfg. Works, Bradley, Ill., a wholly owned Sears subsidiary. The company has its own foundry in which it produces 75 to 80 per cent of its gray iron requirements and all of its own malleable.

New York

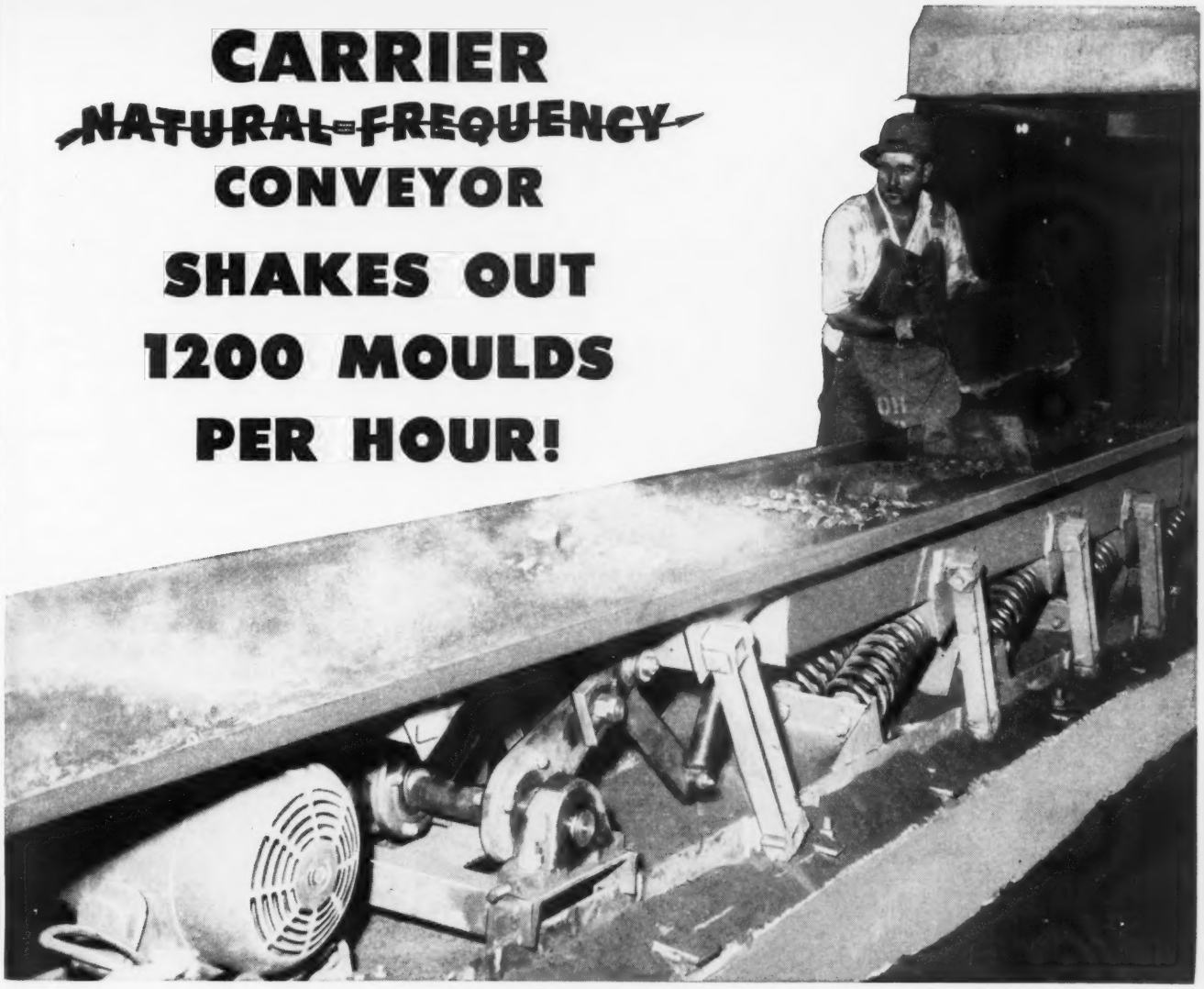
FOLLOWING a sluggish last half in 1953, district gray iron foundries are looking for a mild turn for the better. Some doubt if business for a few weeks will much more than recover from the sharp dip at the holidays, but they believe as they get into February and March that the level will rise above the average for the last several months of last year.

Operators figure that over-all ac-

(*Continued on page* 160)

CARRIER ~~NATURAL-FREQUENCY~~ CONVEYOR

SHAKES OUT 1200 MOULDS PER HOUR!



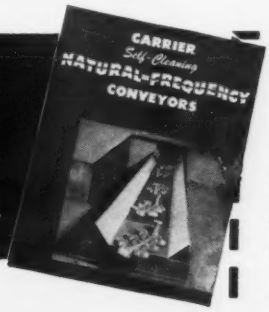
The 35-foot, 5 H.P. Natural-Frequency Conveyor shown above is a real glutton for punishment. It shakes out and conveys 1200 8x14x16 moulds of brass castings per hour — a rugged, heavy-duty job involving from 60 to 100 tons of sand per hour, plus castings!

Carrier Natural-Frequency Conveyors are now delivering spectacular conveying and shakeout performances for scores of foundry operations throughout the country—from the smallest precision castings on up to extremely large, heavy castings. Mail the coupon for all the facts, *today!*

Here's what the Vice-President of the Foundry using the Carrier Natural-Frequency Conveyor illustrated above says about it:

"The performance of this conveyor is very adaptable to our type of work. The long length of the conveyor gives ample time for the separation of the sand from the castings and the removal of the bottom board. It also helps keep different types of castings separated."

Get the Facts About These Rugged Conveyors



Carrier Conveyor Corporation — Dept. F-1-4
Frankfort Avenue at Clifton, Louisville 6, Ky.

Gentlemen: Without obligation, please send me your bulletin describing Natural-Frequency Conveyors.

Firm_____

Street_____

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Att: Mr._____ Dept._____

PREVENTIVE MAINTENANCE

eliminates truck downtime

READY-POWER IS *BEST* FOR PREVENTIVE MAINTENANCE

Tie up a truck because of power failure? Never! Equip your fleet with *interchangeable* Ready-Power gas-electric units and, then, have one extra for the shop. Thus, power units can be rotated for preventive maintenance . . . and your trucks stay *on the job* . . . where they belong.

Remember...Your Truck Is No Better Than Its Power!

CONTINUOUS-DUTY POWER UNITS

The READY-POWER Co.

3813 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

(*Continued from page* 158)

tivity in the metalworking industries is going to be fairly brisk—perhaps not up to last year, but good—and that business, as the new year gets under way, will be given special impetus by replacement of inventories which have been allowed to get abnormally low at plants of casting consumers.

Currently, gray iron shops are operating at around four to five days a week with restricted working forces. Backlogs range two to three weeks. Malleable and steel foundry operations are being sustained at a somewhat better level—five days—although with somewhat limited forces. Delivery promises at the malleable shops run three to four weeks. Steel foundry backlogs average little more than four weeks, this being in sharp contrast to the extended delivery promise of several months ago, when defense work was a strong activating force.

Bronze and brass casting demand is spotty. Exceptions are to be found in some such lines as meters and pumps, and in these cases captive shops are benefiting far more than the jobbing foundries. However, captive shops are suffering along with the others when it comes to shipbuilding and marine accessories. Much interest is being centered at present on the placing of the aircraft carrier *Forrestal*. Should it be placed with a North Atlantic yard, foundries in this area might benefit. Aluminum and magnesium foundries continue active on aircraft work.

Philadelphia

GRAY IRON foundrymen are viewing the outlook somewhat more optimistically. Casting consumers have let their inventories get rather low and foundrymen believe that January will mark the beginning of real improvement. Currently, most shops are operating on a hand-to-mouth basis. Backlogs range two to three weeks.

Specialty plants are doing better on an average than the jobbing shops, although the pipe foundries are lagging seasonally. Expectations are that the latter will begin stepping up production in February to meet requirements of the spring trade.

While steel foundries are continuing to dip somewhat into their backlogs, business, barring holiday interruptions, has been fairly well sustained. In fact, it appears that the low point in recent years was actually reached last September, with a subsequent slight improvement and then a leveling off. Current backlogs average around four weeks. Shops

are having to rely more and more on normal civilian requirements, as the defense work which shot backlogs sky high following the outbreak of the Korean war has declined sharply.

Malleable shops are operating at around 70-75 per cent of capacity, with backlogs averaging a month. Components for consumer durable goods and pipe fittings are providing major support in this area, and are at least cushioning the adverse effects of restricted railroad demand.

Brass and bronze shops are moderately active, with the larger shops doing better than the smaller ones, for the reason that they are better able to handle the close specifications required for such government work as is now coming out. Of all the nonferrous shops the aluminum and magnesium plants are enjoying the best business. Backlogs are still well extended and represent principally government work in the aircraft field.

Richmond Malleable Wins New Safety Award

Richmond Malleable Castings Co., Richmond, Ind., has been declared winner by the Malleable Founders' Society of a special safety award for the plant in the malleable industry which operated longest during 1953 without a lost-time injury.

Men at Richmond have worked more than 23 months without such an injury. One of the smaller plants in the industry, it also won a special award for its division in an annual self-improvement safety competition for 1952 as compared with 1951 by operating without accident during 1952.

Actual presentation of the award has been withheld since each day's operation without injury contributes to the record. The company has not had a lost-time accident thus far this year.

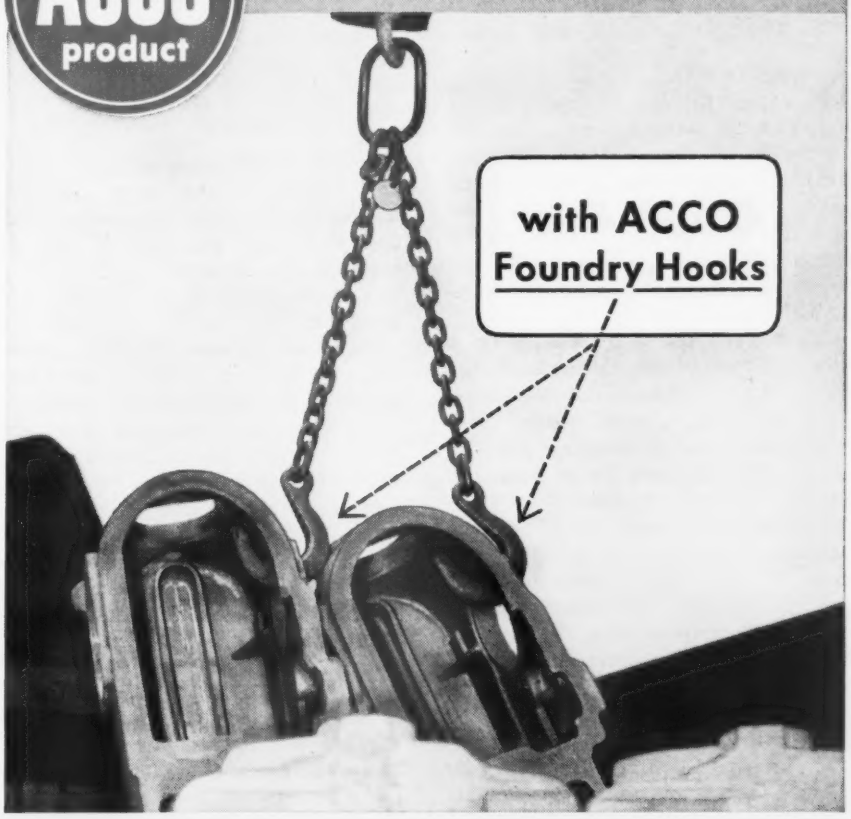
Book Review

Tax Planning for Foundations and Charitable Giving, by William J. Casey, J. K. Lasser and Walter Lord, plastic, 234 pages, 9 x 11½ in., published by Business Reports Inc., Roslyn, N. Y. Price $12.50.

The authors intend this book to help individuals and private groups make full use of the public policy which affords tax savings on gifts and bequests for religious, charitable, educational and scientific purposes. It shows how family foundations can be used in financial and estate planning and how charitable gifts and trusts can conserve cash and create life income.

an ACCO product

ENDWELDUR SLING CHAINS



How You Can Speed Up Handling of Castings

• Castings frequently are odd shaped and hard to hitch to with regular sling hooks. So AMERICAN developed the series 500 ACCO Foundry Hook with rounded point and wide mouth that can be hooked to a wide variety of lifts.

These hooks are drop forged of the same material as the chain. They are built into ACCO *Registered* Endweldur Sling Chains at the factory and the complete assembly is proof-tested from bearing to bearing.

ACCO Foundry Hooks are safer than home-made hooks. And they're cheaper because you save the cost of fabricating and assembling to the chain in your plant. The completed unit bears the well-known ACCO *Registered* identification ring—your assurance of highest sling chain quality.

See your AMERICAN CHAIN distributor or write our York, Pa., office for DH-130

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York, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

American Chain

NORTHWEST REGIONAL CONFERENCE

Draws American, Canadian and Japanese Foundrymen

By HAROLD WOLFER
Puget Sound Naval Shipyard
Bremerton, Wash.

NORTHWEST Regional Conference, AFS, opened Friday morning, Oct. 16, with a plant visitation to the Puget Sound Naval Shipyard at Bremerton, Wash. More than 80 men, including four representatives of a foundry in Japan and many AFS members from British Columbia and Los Angeles, journeyed on the ferry to Bremerton.

They were taken by busses on a tour of points of interest in the yard, including the mothballed inactive fleet, the several Essex class conversions now in progress and two shops, the pattern shop and the foundry. In the pattern shop, construction of a scale model of the Midway class carriers was in progress. In the foundry they observed various molding and casting operations, including pouring of a steel heat and the new salvage operation in which scrap shells are melted and cast into ingot slabs.

Technical sessions Friday afternoon in the Flamingo Room of the New Washington Hotel in Seattle opened with Dr. L. W. Eastwood, Kaiser Aluminum & Chemical Corp., Oakland, Calif., speaking on "Gas in Metals." Dr. Eastwood pointed out that gas precipitation—that is, the evolution in a solidifying metal of a gas that is soluble in the liquid metal, but relatively insoluble in the solid metal—is the chief source of trouble in making castings of aluminum, magnesium and their alloys.

Hydrogen is the chief offender, and he recommended scavenging with a dry fluxing gas. Above all, he stressed the importance of avoiding gas contamination in melting and handling.

Gases which arise from a combination of two dissolved constituent gases in the melt and form a relatively insoluble compound gas were mentioned as the chief source of unsoundness caused by gas in the copper-base alloys.

J. T. Roberts, Gladding, McBean & Co., delivered a paper on "Refractories" for Lee Bennett, vice president of research and development, Gladding, McBean & Co., who was ill. The paper dealt with refractory problems of foundries in the West and called attention to western deposits which are sources of refractories for foundry applications.

An interesting point concerned the use in the southern California area of rectangular, shallow hearth, stack-charged furnaces for melting iron. A feature of this furnace, lending itself to the smoke control programs of the area, is that the dust and solids content of the stock effluent can be controlled effectively by using clean charging stock broken up into small sizes.

Highlight of the first day of the conference was a banquet attended by 210 members and guests Friday evening in the Windsor Ballroom of the New Washington Hotel. Charles Anderson of Eagle Foundry Co. Seattle, was master of ceremonies. Herbert Scobie, American Foundrymen's Society, Chicago, had a brief message for the group, as did M. J. O'Brien Jr., a national director of the AFS, who is currently with Atlas Foundry & Machine Co., Tacoma, Wash.

Dr. Warren E. Tomlinson, professor of history, College of Puget Sound, Tacoma, spoke on "Problems of Germany and Yugoslavia—1953." Dr. Tomlinson, who was the leader of a group of ten students who actually lived with Yugoslav families in, as the doctor put it, an experiment in international living, described the Yugoslavs as basically friendly to Americans.

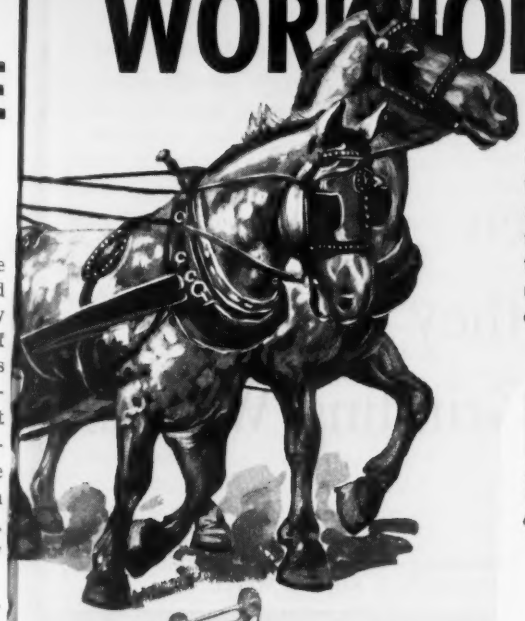
A peculiar type of totalitarianism exists in Yugoslavia, he said. These people, following a Marxist line, not in accord with Russian aims, are not behind the Iron Curtain, but do not have complete, democratic freedom of expression. Their industrial economy is poor and growing slowly. The inefficiencies of the totalitarian state make it doubtful that they can catch up with us.

Technical sessions were held all day Saturday at Guggenheim Hall on

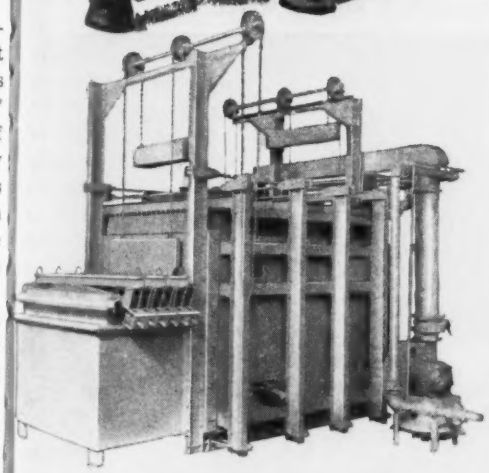
(*Concluded on page* 165)

From left to right in this scene showing part of the group at the speakers table at the conference banquet are Howard H. Havies, Vivian Diesels & Munitions Ltd., Vancouver, B. C., vice chairman of Vancouver Chapter of the AFS; Prof. W. E. Tomlinson, College of Puget Sound, Tacoma, Wash., speaker; M. J. O'Brien Jr., Atlas Foundry & Machine Co., Tacoma, a national director of the AFS; C. E. Anderson, Eagle Foundry Co., Seattle, master of ceremonies; Herbert Scobie, American Foundrymen's Society, Chicago; Edward P. Boyle, Puget Sound Naval Shipyard, conference chairman; and William Mackey, Washington Stove Works, Everett, Wash., who is the chairman of the Washington Chapter of the AFS

WORKHORSES for ALUMINUM

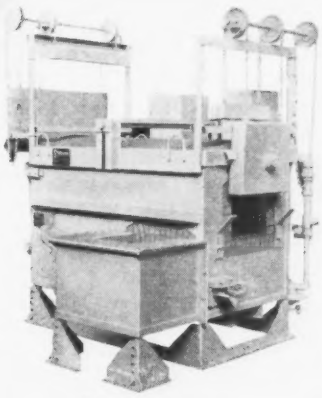


Here are the furnaces that bear the brunt of the burden in the aluminum foundry industry. They are designed for production of unsurpassed quality metal, in the fastest, most efficient and economical manner. Each has its specific purpose and capacity, meeting the exacting demands of sand foundries, die casters, permanent mold plants and smelters. They are recognized as the finest in the industry, reduce costs and make working conditions most agreeable. All furnaces may be fired by either gas or oil.



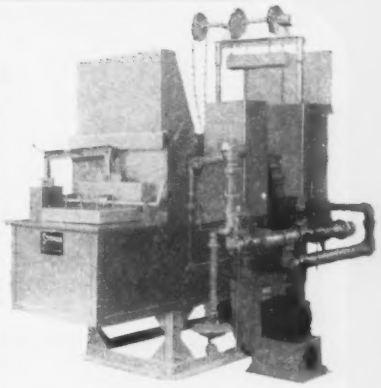
SMELTERS FURNACE

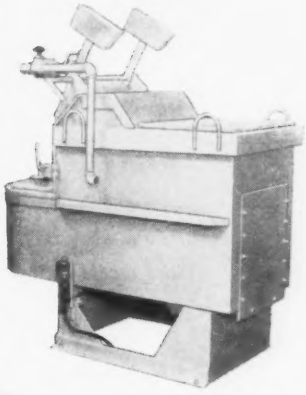
Built especially for smelters and other large melters. Easy charging, drossing, fluxing and alloying. Can be built to your own specifications. Capacities from 3000 lbs. Aluminum up.



MODEL "DC" FURNACE

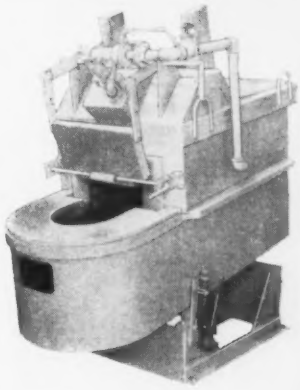
The 2 in 1 furnace. Breakdown and Holding in the same unit. Cold metal never reaches the molten bath. Assures metal of the finest quality on all classes of work. Close temperature control. Can be used as a sweat furnace for reclaiming inserts. Ideal for all types of plants including sand, permanent mold and die casting. Capacities from 350 lbs. Aluminum up.

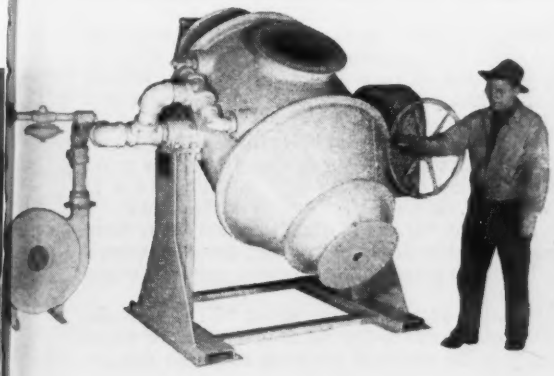




MODEL "DSC" DIE CASTING FURNACE

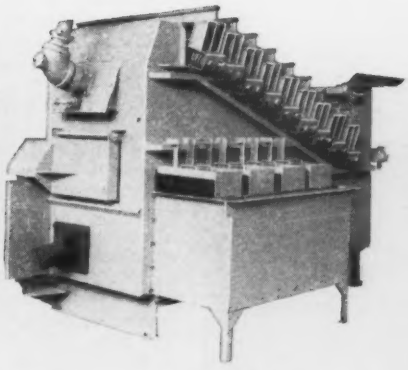
A small reverberatory furnace for melting and holding, or for holding only when hot charged at the die casting machine. Made in various sizes to meet your requirements.





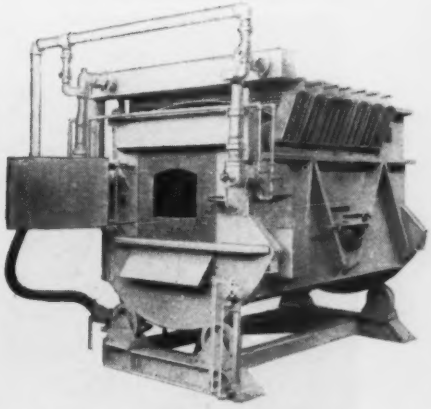
MODEL "BFC"

Hand tilt, open flame, barrel type furnace with flames firing tangent to inside of lining. Very fast melting. Used in all type plants including smelters. Capacities—500 lbs. Aluminum. A must for all aluminum jobbing sand foundries.



MODEL "MC" DIP-OUT TYPE

For melting and holding all in the same furnace. Hot metal always available. No iron pots or crucibles to replace. Capacities from 500 to 5000 pounds of aluminum.



MODEL "SW"—TILTING TYPE

Excellent to run back returns along with ingot required for permanent mold, die or sand casting operations. Also an ideal breakdown furnace. Capacities—600-1000-1700-3000 lbs. Aluminum.

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

Foundrymen tell why they pick "U. S." Grinding Wheels

Smoothing casting of an elbow with a resinoid U. S. Royalite Wheel.

Smoothing the casting of a railroad equipment bushing.

Grinding a casting of Pearlitic Malleable iron.

Consider, for example, a foundry in Georgia, casting steel pipe fittings, removing gates and flash, grinding openings and bolt holes. The management standardized on resinoid U. S. Royalite® Wheels exclusively because they had proved to be the most efficient and economical.

Then there were the makers of Meehanite castings. They found that United States Rubber Company's wheels could not only grind Meehanite but steel and alloy castings as well—enabling them to stock just *one kind of wheel*. So now it's "U. S." for Meehanite.

Another foundry settled on "U. S." Wheels to grind gates from castings of Pearlitic Malleable Iron. Why? Because the wheels stayed cool under the high-pressure, high-speed grinding – and showed excellent economy.

There are countless other success stories about "U. S." Wheels. Whatever the application, whatever the resinoid or rubber wheel required, "U. S." will provide you with precisely the *right* one for the job.

Keep in mind that the "U. S." sales engineer is a specialist in abrasives. Consult him on any of your high-speed grinding wheel problems. It pays off. Get in touch with him through the address below.

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(*Concluded from page* 162)

the University of Washington Campus. At the first session, Mr. Harry H. Kessler, co-owner, Sorbo-Mat Process Engineers, St. Louis, spoke on the "Basic Cupola."

Mr. Kessler outlined a practical method of making ductile iron in the cupola. The secret, he explained, is to melt with low sulphurs. This procedure can be accomplished best with a basic lining and basic fluxing materials. Since a high iron oxide content is associated with strongly acid conditions and high sulphur content, we should strive to melt hot, reduce and nodulize with magnesium, cerium, rare earth oxides and fluorides.

When the proper basic conditions are achieved, high carbons and low sulphur content are obtained along with high temperatures. He reported best results with slags high in CaO content (normally 12 per cent basicity) and stressed the importance of high slag volumes up to 20.

Chemical Balance Is Important

He also stressed the importance of refractory maintenance in the melting zone to insure uniform volume so that proper proportions of slagging materials and rate of melting can be maintained since the product depends entirely on maintaining the proper chemical balance.

Mr. Kessler demonstrated how simply the basic-lined cupola can be started out melting basic to pour nodular iron castings and then can be changed for the remainder of the heat to pour regular gray iron castings, once the technique of control is mastered.

A film, "Effects of Gating Design on Casting Quality," illustrated how casting defects resulting from dross, inclusions and entrapped gases are caused by improper sprues and gates which cause turbulence, aspiration and entrainment of air and gases. It was demonstrated that properly designed pouring basins, tapered sprues and enlarged wells at base of sprue, coupled with runners with rounded corners and proper proportion in relation to cross-sectional area of the sprue, produce castings free of these defects.

In the next session, Cliff Wenninger, National Engineering Co., in his talk on "Sand Reclamation" outlined the progress made in this field. While thermal treatment has given good results on core sands, he said, wet or dry scrubbing is required to remove accretions or "shells" of clay and debris from clay-bonded sands in order to restore good molding sand properties.

Abrasion and impact are necessary, followed by removal of fines and debris. He illustrated with slides the equipment his company has developed for this purpose, using dry scrubbing for abrasion and cyclone removal of silt and fines.

Luncheon was at the "Hub" on the campus. Dr. Gilbert S. Schaller presided. Dr. Wessman, dean, College of Engineering, University of Washington, welcomed the foundrymen and introduced Dr. J. H. Manly, executive officer, department of physics, who spoke on "Atomic Energy."

Dr. Manly discussed some of the practical aspects of producing electrical power for commercial distribution from the heat energy produced by atomic reactors. He pointed to development of new dual-purpose reactors as a constructive step in a sensible long-range program to exploit electric power production as a by-product which can bolster the long range research in atomic energy and keep us in the forefront in the development of atomic materials for weapons for defense.

Bernard Ames, supervisor, Physical Metallurgical Materials Laboratory, New York Naval Shipyard, spoke on "Shell Molding" and gave a comprehensive account of shell molding materials, equipment, operating techniques, applications and economic factors. Shell molding has spurred research and renewed thinking on our present molding practices, Mr. Ames said.

Frank K. Shallenberger, president, Shalco Engineering Corp., Palo Alto, Calif., illustrated his talk on "Shell Molding Machines" with slides showing the history and development of mechanized equipment in this new foundry field.

Following this, the foundrymen adjourned to the University of Washington foundry, where Mr. Shallenberger turned out shell molds with one of his machines. He also demonstrated a machine for extrusion of shell cores.

Foundrymen also examined the display of castings produced by the university foundry using 100 per cent olivine sand, a material with which the university has carried on extensive research and development under the direction of Prof. William A. Snyder.

Social activities of the conference were climaxed by a dance attended by 175 members and guests in the Windsor Ball Room of the New Washington Hotel.

Durez Issues Guide to Shell Molding

"Durez Guide to Shell Molding" is the title of a 36-page, 8½ x 11 in. illustrated booklet just published by Durez Plastics & Chemicals Inc., Walck Rd., North Tonawanda, N. Y. Available at no cost to foundrymen, casting buyers and product engineers, it contains a variety of information.

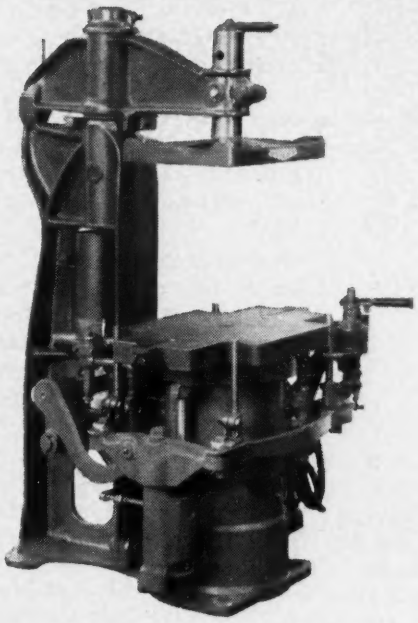
Subjects covered range from many kinds of technical data to material on patent status, equipment, costs, sand recovery and others. It also deals with many common problems encountered in shell molding and suggests possible causes and solutions.

Frank K. Shallenberger, president, Shalco Engineering Co., Palo Alto, Calif., demonstrates the production of shell molds on his firm's machine

THE OSBORN MANUFACTURING COMPANY
5401 Hamilton Avenue Cleveland 14, Ohio

on every line...

ORN JOLT SQUEEZE STRIPPERS
SURE FAST, ACCURATE MOLDING



Osborn Jolt Squeeze Strippers available portable or stationary with manual or automatic controls. Can be furnished with side roll-on and roll-off. Complete range of sizes with squeeze pistons from 10" to 26" diameter.

ANOTHER EXAMPLE OF OSBORN LEADERSHIP AND ADVANCED ENGINEERING

RUGGED DESIGN. To assure accurate molding, Osborn Jolt Squeeze Strippers have heavy, beam-type squeeze head reinforced with a cast steel post which has a supporting bracket at the rear to resist bending loads.

EASY SWINGING HEAD is mounted on a large thrust-type ball bearing. An adjustable stop positions the squeeze plate over the table for right hand or left hand swing.

HARD EFFECTIVE JOLT with large diameter, well guided jolt pistons. For special applications, vibrating type jolt, which may be applied simultaneously with the squeeze, can also be furnished.

WIDE RANGE OF ADJUSTMENT on lifting pins. Pins are carried on a draw frame actuated by separate draw cylinders.

OIL CONTROLLED DRAW with separate draw cylinders having both the speed and length of slow draw adjustable and with an automatic change from slow to fast draw.

GET FULL DETAILS. Write *The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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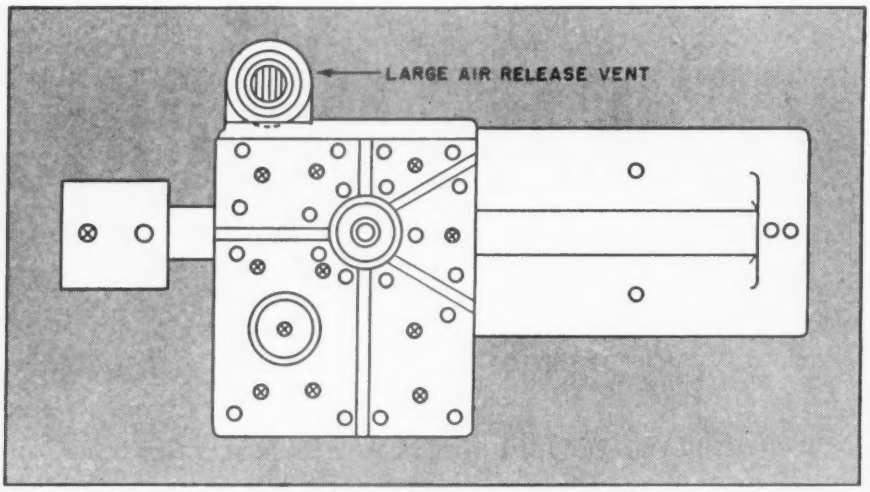
MOLDING MACHINES CORE BLOWING MACHINES INDUSTRIAL BRUSHES

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

A B C of Foundry Practice

By PAT DWYER

Engineering Editor



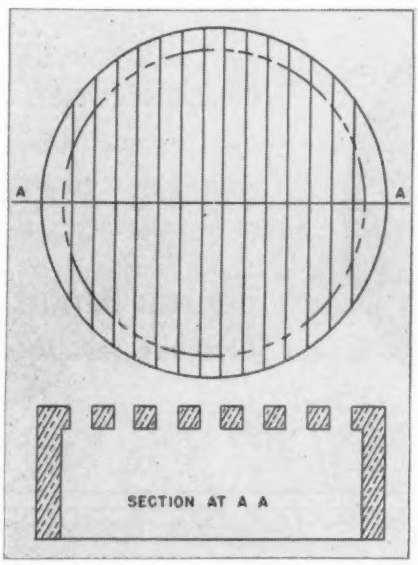
Typical layout shows blowholes marked with X, release vents marked with 0

Core Blowing Equipment and Use (II)

THIS second of a series of articles based on a recent survey prompted by an inquiry from a foreign foundryman incorporates the comments of two leading manufacturers of core blowing equipment. One remarks as follows:

"So far as we know, only one manufacturer of core blowing machines in this country provides a built-in sand agitator as standard equipment. Normally, in our opinion, if the core sand is reasonably flowable and the coreboxes are rigged with proper blow holes and vents, a mechanically operated agitator is not necessary. Personally, we take exception to the statement in the first paragraph of your foreign subscriber's inquiry that with high-strength sands and large blow holes, he has to vent heavily. The venting problem of a corebox bears no relation to the strength of the sand. Vents in the corebox expel the atmospheric air trapped in the box when it is clamped, also the portion of the blow air which enters the box with the sand.

"Piping or cratering in the sand reservoir is characteristic of any core blowing operation. The condition becomes more critical with a stiff sand which does not flow readily. Possibly the moisture content of your inquirer's sand is too high. The cratering might be reduced by lowering the moisture content to 2 or at most 3 per cent. Better spacing and distribution of blow holes keeps more sand in movement during the blowing period; it also holds to a minimum the dead sand in the reservoir. A cross stream of air has been tried in an effort to overcome the cratering effect. To the best of our knowledge it has not been very successful up to the present.



This enlarged view shows a slotted brass vent plug. The slots permit the air to escape, but hold the sand

No Fixed Ratio — "In American foundries there is no hard and fast rule on the ratio of blow holes to vent area. Most of the automotive foundries, which probably have the best production, core blowing operations, aim at a 5 or 6 to 1 area of vent to area of blow holes, practically 6 square in. of vent area to 1 square in. of blow hole area. This formula permits approximately 50 per cent of the vents to plug up during the day's operation, as a result of repeated blowing and air drying of the sand, before any appreciable difference in core quality is noticed.

"Normally the position of the blow holes in any corebox is determined by the type of core to be blown. An even distribution of blow holes throughout the box usually is desirable since it keeps more sand moving within the reservoir, and at the same time does not force as long a travel within the box itself. Of course, blow holes should be positioned whenever possible at the deepest points in the core where the greatest volume of sand is required. The size of the blow hole should be sufficient to permit the sand to flow through it freely. Actual diameter would be determined by the type of sand employed.

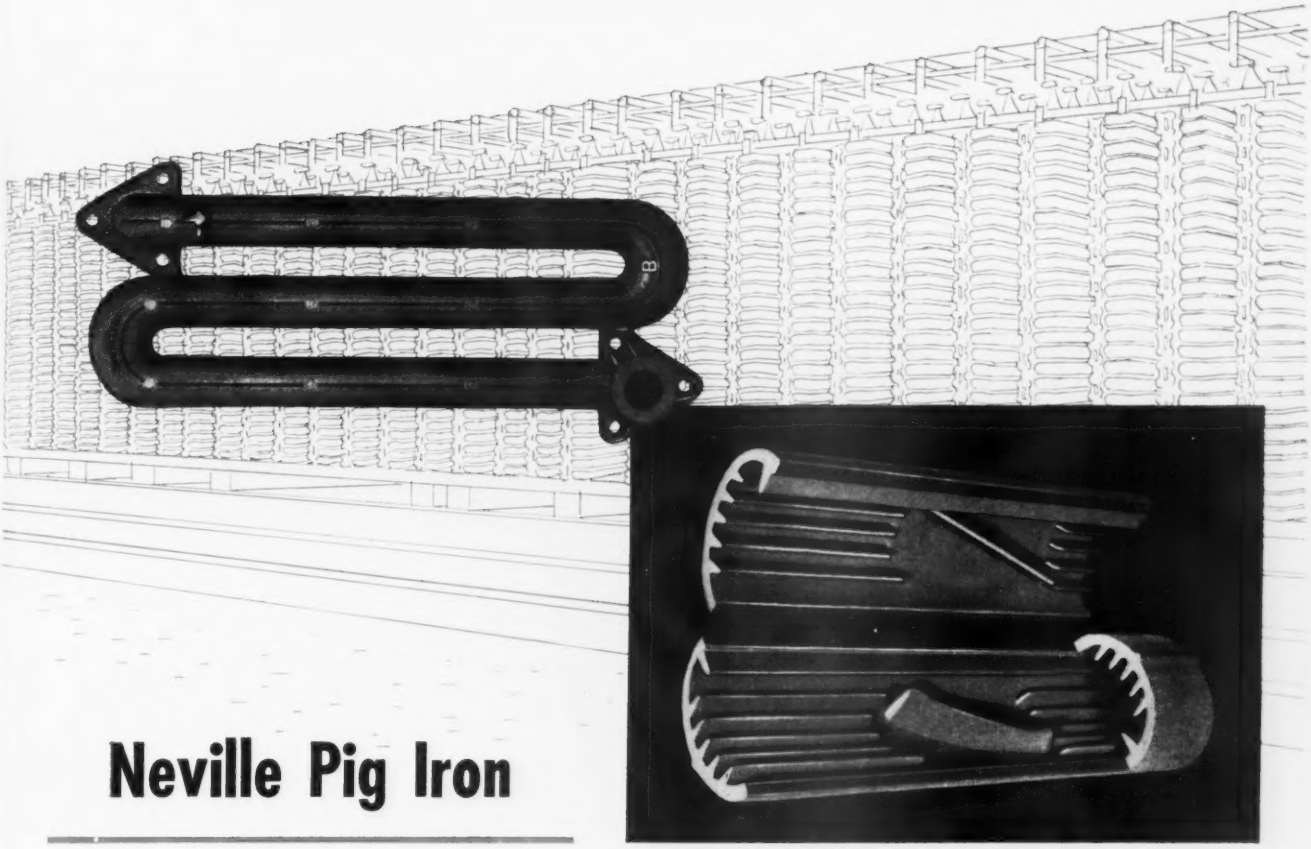
"Most cores in American foundries are blown with one shot when the boxes are vented properly. Two blows sometimes are employed on under vented coreboxes. The interval between the blows provides additional time for the trapped air to escape through the vents. The second blow packs the sand a little harder than the first. The second blow should not be necessary. It only offsets under venting of the corebox.

"We presume that reference to a cylindrical core 1⅜ x 6 in. means that it is one of the jobs that is giving trouble. When a core of this type is blown on end, majority of the venting is along the vertical parting line of the corebox. If the inquirer is not doing it already, he might install a vent plate on the table of the machine. In that way the core will be vented at the top, bottom and along the vertical part-

(*Concluded on page* 171)

These National Cast Cooling Sections

have to take it!



Neville Pig Iron

provides the uniform quality and close grain they need

CAST cooling and condensing sections made by The National Radiator Company, Johnstown, Pa., face some of the toughest service conditions in industry. In chemical plants, petroleum refineries and similar plants, the sections are in constant contact with corrosive materials such as salt water and concentrated sulfuric acid. To withstand these conditions National sections must be cast from gray iron of exceptionally high quality and close grain. And to achieve accuracy in the internal fin design shown above, the gray iron must provide excellent fluidity in casting. To meet these rigid requirements, National Radiator specifies Neville Pig Iron for its cast section production.

W&D 4953

NEVILLE

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PIG IRON DIVISION

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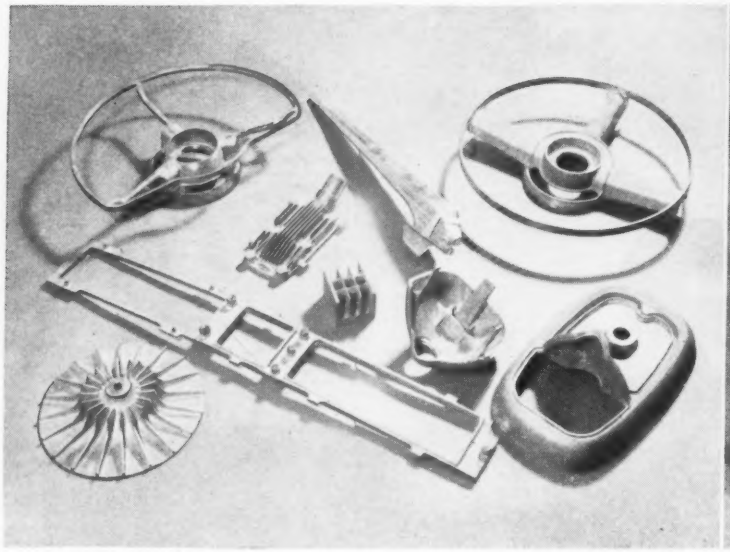

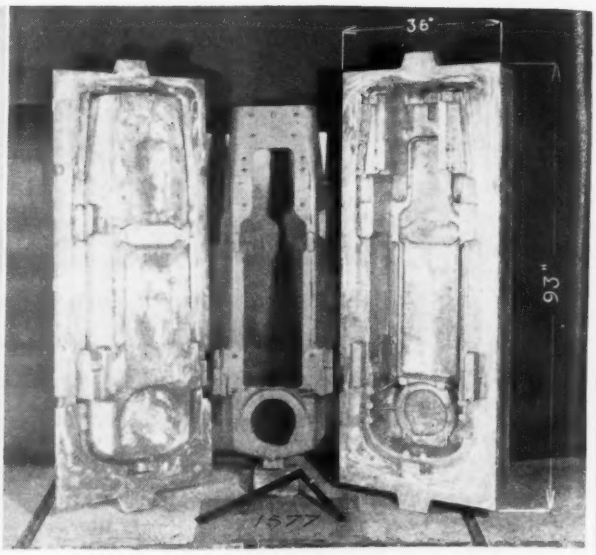

Sample and experimental zinc base, aluminum and bronze castings. Exact prototypes of die castings to follow for the automotive, home appliance and other industries requiring trim for pilot models. These may be experimental castings, or even short run production. We can work from your die models, loose patterns or blueprints.

Shell molding pattern equipment, matched cope & drag shell molding boxes, cope & drag plates for production. Get positively "mated shells" warpage free. We pressure cast shell molding pattern equipment to your specifications in aluminum or bronze. Also aluminum and bronze cope & drag plates and core boxes for production in sand. Get our quotation.

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(*Concluded from page* 168)

ing line.

"The foundryman does not state how many cores are blown at one time, and whether he has more than one core in the corebox. With a single box operation, he is extracting only a small amount of sand from the reservoir for each blow. This would accentuate a cratering condition. A multiple or gang corebox would serve more satisfactorily. If this solution is not practical, he could reduce the size of the sand reservoir, a remedy already indicated by the installation of tapered blocks. This would give a stronger and more powerful blow. For maximum blowing power of a core blowing machine the ideal condition is attained when the reservoir contains three times the amount of sand required for the corebox. Usually it is not practical to secure such a low ratio. However, any steps taken in this direction will increase the hardness of ram in the core blower."

Other Comment—Views of another manufacturer follow:

"Principles of coremaking by hand and by blowing are much the same. The same fundamental equipment and materials—coreboxes, plates, driers, ovens, sand, oil or other binders, grain size, moisture content, etc. —are employed. The same end result is desired—a good uniformly rammed core, true to shape and dimensions. The principal difference is in the type of labor necessary. In hand ramming the sand is placed in the corebox and rammed either by hand or with a blunt instrument. In core blowing the sand is carried in and is packed in the corebox to the required density by compressed air.

"To produce satisfactory cores consistently the following items are essential: 1—A properly operating core blower. 2—Properly rigged corebox equipment, preferably metal. 3—Properly mulled sand mixture. The core blower should be rigged to stand up under actual foundry conditions, should operate quickly and easily, should offer easy accessibility to the coreboxes and should be amply capable of doing the work.

To determine the capacity of the core blower for a given job, three factors are paramount: The open area of the corebox must not exceed the vertical clamping area of the core blower. The sand magazine should hold at least twice as much sand as needed for the core, and have an open area close to the size of the corebox. The supply of air must be sufficient.

"Properly rigged corebox equipment depends on the design of the ultimate casting and the type of core needed. Some cores are easy to blow; others are difficult. The most important feature in the construction of good corebox equipment is the placing of blowholes and vents. Many small blowholes produce better results than a small number of large blowholes. Large holes tend to *dump* the sand. Small holes *spray* the sand at greater velocity and pack it much better. Hard-to-get-at-corners are taken care of better with well directed small holes.

"Properly mulled core sand is highly important. However, to make uniform, high-class cores on a blower, no radical change is needed from the sand mixture used for hand coremaking. Mixtures used satisfactorily for hand operation usually will serve satisfactorily with a core blowing machine. Core sand always should be thoroughly prepared. Mulling is recommended, whether the sand is to be packed by hand on the bench or used in a core blower. Complete mulling results in maximum physical properties with a minimum amount of binder. Proper mulling with correct amounts of ingredients results in uniform sand properties and insures good flowability. Usual moisture content for core sand used in core blowing machines ranges between 1½ and 3 per cent. Low moisture content results in poor blowing and excessive corebox wear. Moisture that is too high causes sand to stick in the corebox and causes channeling of sand in the magazine.

"The type of blowhole bushing is another important item. Many types are commercially available. Some are lined with rubber, others carry adaptable sleeves, and some are simply short pieces of steel or brass tubing. However, when properly installed they all serve the same purpose. They provide an air-tight seal between the blow plate and corebox or vent plate during the blowing cycle. After the core is blown and is ready to be stripped or drawn, the bushing should break the sand cleanly and evenly at the core line to save extra labor.

WISCONSIN FOUNDRY CONFERENCE

To Be Held Feb. 11-12

SEVENTEENTH annual Wisconsin Foundry Conference will be held at the Hotel Schroeder, Milwaukee, Feb. 11-12. As in past years it is being sponsored by the Wisconsin Chapter of the American Foundrymen's Society and the University of Wisconsin.

A full schedule of technical sessions has been arranged for the two days, with two luncheons and the annual banquet completing the program.

R. V. Osborne, Lakeside Malleable Castings Co., Racine, Wis., will be general chairman of the conference, with P. C. Fuerst, the Falk Corp., Milwaukee, co-chairman.

The program follows:

Thursday, Feb. 11

9 a.m.—**Registration.**

10 a.m.—**Welcoming addresses.** Collins L. Carter, Albion Malleable Iron Co., Albion, Mich., national president, AFS, and Dean Kurt F. Wendt, University of Wisconsin.

10:40 a.m.—**General meeting.** Walter F. Scholtz, Allis-Chalmers Mfg. Co., West Allis, Wis.

12 Noon—**Luncheon.** Hans J. Heine, acting technical director, AFS, Chicago.

2:15 p.m.—**Sectional Meetings.**

Malleable—"Work Simplification," James H. Smith, general manager, Central Foundry Division, General Motors Corp., Saginaw, Mich.

Nonferrous—"Light Alloy Foundry Practice," Hiram Brown, Solar Aircraft Co., Des Moines, Iowa.

Gray Iron—"Up to the Minute Coverage of Synthetic Resins in the Foundry," W. A. Sokolosky, Monsanto Chemical Co., St. Louis.

Steel—"Practical Applications of Recent Information to the Feeding of Steel Castings," B. C. Yearley, National Malleable & Steel Castings Co., Cleveland.

Pattern—"Casting and Related Pattern Design," William Bender, General Electric Corp., Erie, Pa.

4 p.m.—**Sectional Meetings.**

Malleable—"Mechanization of Core Making" (film), Don M. Gerlinger, Adam Kaska, Walter Gerlinger Inc., Milwaukee. "Malleable Melting Practice," W. D. McMillan, metallurgist, McCormick Works, International Harvester Co., Chicago.

Nonferrous—To be announced.

Gray Iron—"Cupola Practice," Sam Carter, American Cast Iron Pipe Co., Birmingham.

Steel—"Modernization of the Foundry," Glenn W. Merrefield, Giffels & Vallet Inc., Detroit.

Pattern—"Where Now?" George K. Dreher, Waukesha Foundry Co., Waukesha, Wis.

6:30 p.m.—Banquet. "Bread, Butter and Baloney," David P. Livingston, Washington, Iowa.

Friday, Feb. 12

10 a.m.—**Sectional Meetings.**

Malleable—"Effect of Melting Furnace Atmospheres on Mechanical Properties of Malleable Iron," Prof. R. W. Heine, University of Wisconsin.

Nonferrous—"Brass Foundry Practice," H. St. John, Crane Co., Chicago.

Gray Iron—"Core Blowing Yesterday and Today," L. D. Pridmore, International Molding Machine Co., La Grange Park, Ill.

Steel—"Housekeeping in the Foundry," C. G. Lauckner, General Electric Co., Schenectady, N. Y.

Pattern—"Practical Construction of Wood Patterns," Walter Siebert, Standard Pattern Works, Cleveland.

12 noon—**Luncheon.**

"Directing Foundry Operations from Elephantback in India," John F. Schnur, International Dept., Armour Research Foundation, Chicago.

2:30 p.m.—**Sectional Meetings.**

Malleable—"Foundry Refractories," Ray Witschey, A. P. Green Fire Brick Co., Chicago.

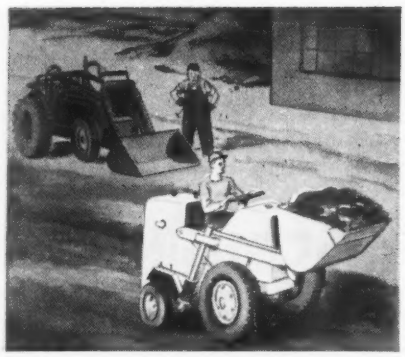
Nonferrous—"Information Forum."

Gray Iron—"Gating and Risering," Tom Curry, Lynchburg Foundry Co., Lynchburg, Va.

Steel—"Casting Quality as Related to pH Values of Sand," C. G. Grott, Unitcast Corp., Toledo, O.

Pattern—"Patterns for Shell Molding," Ray Olson, Shell Process Inc., Chicopee, Mass.

You can't compete if your equipment is obsolete!



With business conditions more competitive, it is more important than ever to analyze your production costs . . . your handling methods . . . your tools and equipment.

Obsolete methods and equipment take a heavy toll by slowing down production, increasing manhours and increasing repairs and maintenance. Material handling equipment in many plants is the key factor in efficient production — the pace setter for the entire plant. That is why it is so important to keep raw materials *on the move* in and out of the plant, to and from processing machinery — with the most modern, efficient methods and equipment.

If you are not using "PAYLOADER" Tractor-Shovels at present, it will pay you to investigate this fast, flexible, versatile system that is producing outstanding economies in all sizes of plants throughout the nation.

If your plant is already "PAYLOADER"-equipped, you'll be pleasantly surprised at the superior performance of the late model "PAYLOADERS". Although "PAYLOADERS" are built for years and years of dependable service, constant research and engineering improvements keep "PAYLOADERS" out in front in design, construction and performance.

Now is the time to trade in obsolete equipment — to gear your plant to present day conditions — to assure profitable operation on existing or slightly lower sales volume. Your nearby "PAYLOADER" Distributor will be glad to discuss your material handling methods and provide a demonstration of this equipment. For his name and address write The Frank G. Hough Co., 703 Sunnyside Avenue, Libertyville, Illinois.

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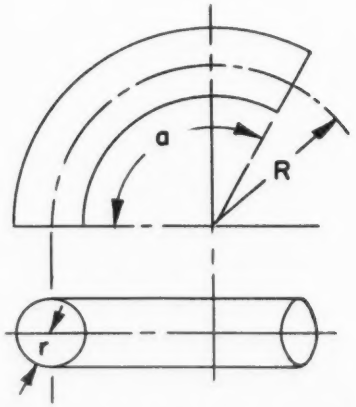
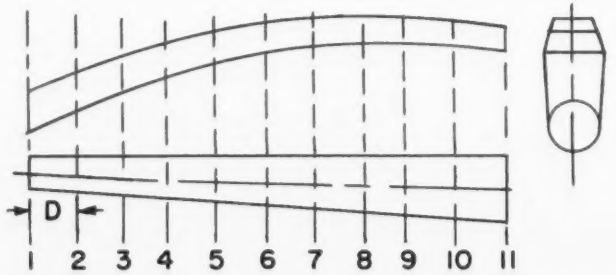
Formulas for Determining Weights of Castings

(Continued from December)



To find the weight of a sector of a ring of circular cross section, multiply the radius of the cross section squared by the radius of the circle passing through the center of the cross section, by the number of degrees in the angle by the value of M. (Table XV).

$$W = r^2RaM$$



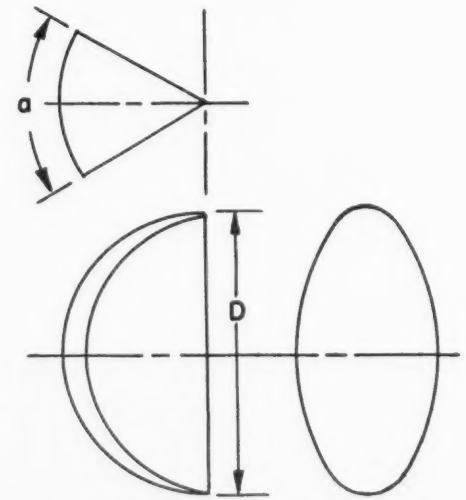
To find the weight of an irregular casting, which cannot be divided into elementary solids, use the following method based on Simpson's rule:

Divide the length of the casting into an even number of parts of equal length D (the greater the number of divisions, the greater will be the accuracy in the final result) by parallel planes. Add the areas of the two ends and designate the sum A.

Add the areas of cross-sections made by the even cutting planes, i. e., 2, 4, 6, etc., and designate this sum by B. Then add the area made by the odd cutting planes, except the ends, calling this sum C.

The weight of the casting is equal to the sum of A, four times B and two times C multiplied by D, by the value of K in Table XIV.

$$W = (A + 4B + 2C)DK$$



To find the weight of a hollow spherical wedge, multiply the difference between the outside diameter cubed and the inside diameter cubed by the number of degrees in the angle, by the value of M (see Table XIII) corresponding to the weight per cubic inch of material used.

$$W = (D^3 - d^3)aM$$

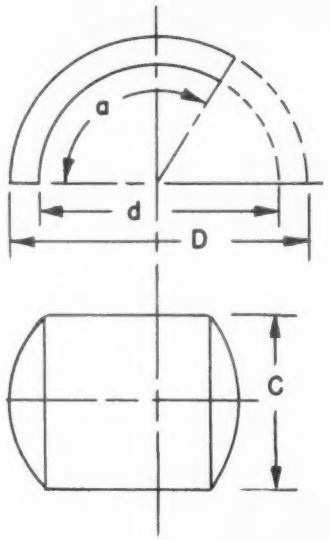
Table XIV

Wt. per cu. in.	K	Wt. per cu. in.	K	Wt. per cu. in.	K	Wt. per cu. in.	K	Wt. per cu. in.	K	Wt. per cu. in.	K
.096	.0320	.170	.0567	.250	.0833	.330	.1100	.410	.1367	.490	.1633
.100	.0333	.180	.0600	.260	.0867	.340	.1133	.420	.1400	.500	.1667
.110	.0367	.190	.0633	.270	.0900	.350	.1167	.430	.1433	.510	.1700
.120	.0400	.200	.0667	.280	.0933	.360	.1200	.440	.1467	.520	.1733
.130	.0433	.210	.0700	.290	.0967	.370	.1233	.450	.1500	.530	.1767
.140	.0467	.220	.0733	.300	.1000	.380	.1267	.460	.1533	.540	.1800
.150	.0500	.230	.0767	.310	.1033	.390	.1300	.470	.1567	.550	.1833
.160	.0533	.240	.0800	.320	.1067	.400	.1333	.480	.1600	.560	.1867

Interpolation Table

Add'l. Wt.	Add'l. K	Add'l. Wt.	Add'l. K	Add'l. Wt.	Add'l. K
.001	.0003	.004	.0013	.007	.0023
.002	.0007	.005	.0017	.008	.0027
.003	.0010	.006	.0020	.009	.0030

For method of Interpolation, see Table II. (July issue page 150)



To find the weight of a sector of a ring made by cutting a cylindrical hole through the center of a sphere, multiply the chord cubed by the number of degrees in the angle, by the value of K corresponding to the weight per cubic inch of material used. (See Table XV).

$$W = C^3aK$$

The chord is equal to the square root of the result obtained by subtracting the square of the diameter of the hole from the square of the diameter of the sphere.

$$C = \sqrt{D^2 - d^2}$$

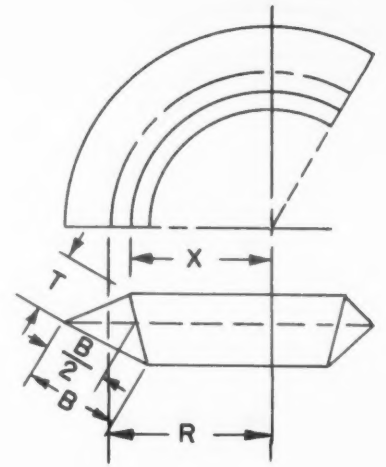
Table XV

Wt. per cu. in.	K	M	Wt. per cu. in.	K	M	Wt. per cu. in.	K	M	Wt. per cu. in.	K	M
.096	.000140	.00526	.210	.000305	.01151	.330	.000480	.01809	.450	.000654	.02467
.100	.000145	.00548	.220	.000319	.01206	.340	.000495	.01864	.460	.000669	.02522
.110	.000160	.00603	.230	.000334	.01261	.350	.000509	.01919	.470	.000684	.02577
.120	.000174	.00658	.240	.000349	.01316	.360	.000524	.01974	.480	.000698	.02632
.130	.000189	.00713	.250	.000363	.01371	.370	.000538	.02029	.490	.000712	.02687
.140	.000203	.00768	.260	.000378	.01426	.380	.000553	.02084	.500	.000727	.02742
.150	.000218	.00822	.270	.000393	.01430	.390	.000567	.02138	.510	.000741	.02796
.160	.000233	.00877	.280	.000407	.01535	.400	.000582	.02193	.520	.000756	.02851
.170	.000247	.00332	.290	.000421	.01590	.410	.000596	.02248	.530	.000770	.02906
.180	.000261	.00987	.300	.000436	.01645	.420	.000611	.02303	.540	.000785	.02961
.190	.000276	.01042	.310	.000450	.01700	.430	.000625	.02358	.550	.000800	.03016
.200	.000291	.01097	.320	.000465	.01755	.440	.000640	.02413	.560	.000815	.03071

Interpolation Table

Add'l. Wt.	Add'l. K	Add'l. M	Add'l Wt.	Add'l. K	Add'l. M	Add'l. Wt.	Add'l. K	Add'l. M
.001	.000001	.00005	.004	.000006	.00022	.007	.000010	.00038
.002	.000003	.00011	.005	.000007	.00027	.008	.000012	.00044
.003	.000004	.00016	.006	.000009	.00033	.009	.000013	.00049

For method of Interpolation, see Table II. (July issue page 150)



To find the weight of a segment of a ring of triangular cross-section multiply the base of the triangle by the altitude, by the sum of twice the radius of the circle described, by the center of the base and the radius of the circle described, by the vertex of the triangle, by the number of degrees in the angle, by the value of M (Table XVI) corresponding to the weight per cubic inch of material used.

$$W = BTaM\ (2R + r)$$

Table XVI

Wt. per cu. in.	K	M	N	Wt. per cu. in.	K	M	N	Wt. per cu. in.	K	M	N
.096	.00132	.000279	.00168	.250	.00343	.000727	.00436	.410	.00561	.001193	.00715
.100	.00137	.000291	.00175	.260	.00356	.000756	.00454	.420	.00575	.001222	.00733
.110	.00150	.000319	.00192	.270	.00370	.000785	.00471	.430	.00589	.001251	.00750
.120	.00164	.000349	.00210	.230	.00384	.000815	.00489	.440	.00603	.001280	.00768
.130	.00178	.000378	.00227	.290	.00397	.000844	.00506	.450	.00617	.001309	.00785
.140	.00192	.000407	.00244	.300	.00411	.000873	.00524	.460	.00630	.001338	.00803
.150	.00206	.000436	.00262	.310	.00425	.000902	.00541	.470	.00644	.001368	.00820
.160	.00220	.000465	.00279	.320	.00438	.000931	.00558	.480	.00658	.001397	.00833
.170	.00233	.000495	.00297	.330	.00452	.000960	.00576	.490	.00672	.001426	.00855
.180	.00246	.000524	.00314	.340	.00466	.000989	.00593	.500	.00685	.001455	.00378
.190	.00260	.000553	.00331	.350	.00480	.001018	.00611	.510	.00699	.001484	.00890
.200	.00274	.000582	.00349	.360	.00493	.001047	.00628	.520	.00713	.001513	.00903
.210	.00288	.000611	.00366	.370	.00507	.001076	.00645	.530	.00727	.001542	.00925
.220	.00301	.000640	.00384	.330	.00521	.001106	.00663	.540	.00740	.001571	.00942
.230	.00315	.000669	.00401	.390	.00534	.001135	.00680	.550	.00754	.001600	.00959
.240	.00329	.000698	.00419	.400	.00548	.001164	.00693	.560	.00768	.001629	.00977

Interpolation Table

Add'l. Wt.	Add'l. K	Add'l. M	Add'l. N	Add'l. Wt.	Add'l. K	Add'l. M	Add'l. N	Add'l. Wt.	Add'l. K	Add'l. M	Add'l. N
.001	.00001	.000003	.00002	.004	.00005	.000012	.00007	.007	.00009	.000020	.00012
.002	.00003	.000006	.00003	.005	.00007	.000015	.00009	.008	.00011	.000023	.00014
.003	.00004	.000009	.00005	.006	.00008	.000017	.00010	.009	.00012	.000026	.00016

For method of Interpolation, see Table II. (July issue page 150)

(To Be Continued)

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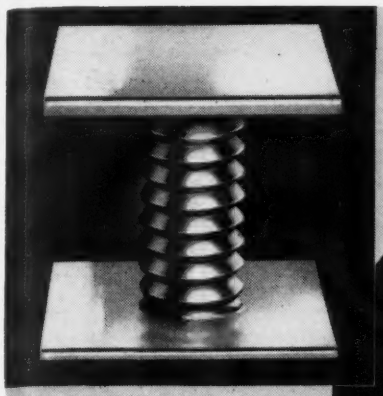
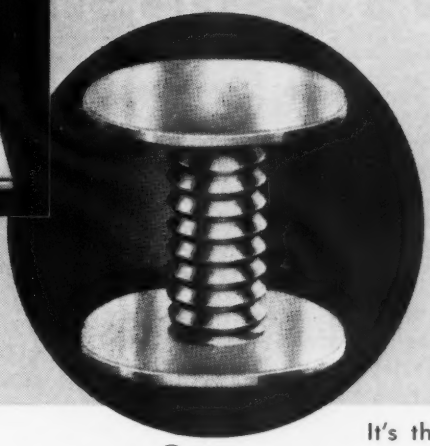


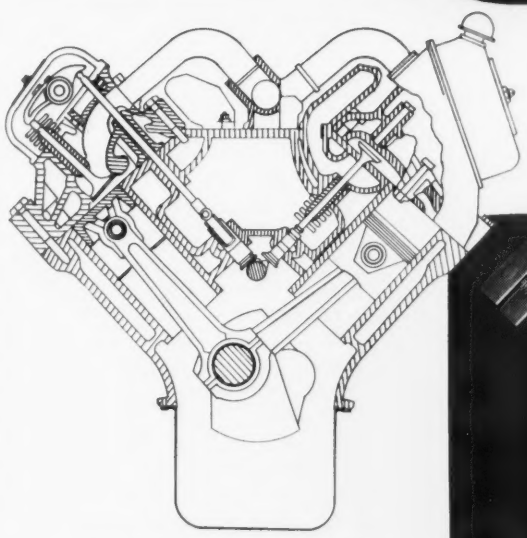
Double Head Thread Stem Chaplets for use on heavier castings. Available in heights for practically any section of metal. Stem diameters range from ⅛" to 1¼". Designs to meet all core and mold conditions.



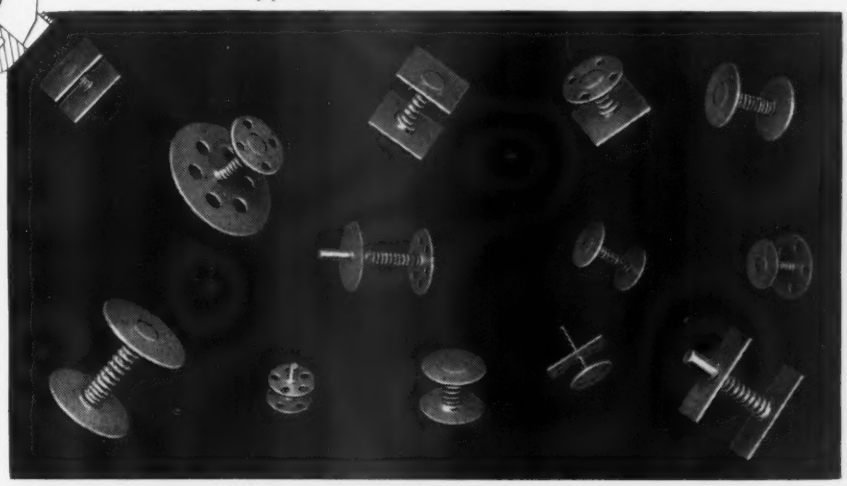
It's The Unusual Features of *Milwaukee* CHAPLETS

that insure Leak-Proof fusing and proper core support

It's the sharply cut "thread stem" design that insures leak proof fusing. Metal melts at the edges first, that's why the sharp edges "burn in" quickly and completely to insure instant fusing which results in freedom from leakers. Here is a design where fusion takes place at exactly the right speed to give you both instant fusion plus proper core support.



Cross Section of a standard "V" engine — a typical casting where proper "burning in" is imperative. Milwaukee Thread Stem Motor chaplets ARE doing an outstanding job on this kind of casting.



MILWAUKEE THREAD STEM MOTOR CHAPLETS

When light castings are subject to gas, steam, water, and other pressures, Milwaukee Thread Stem Motor Chaplets are specially recommended because they cut scrap losses due to leakers. Perforated heads allow trapped gases to escape . . . the lighter mass eliminates chill and because metal melts from edges, you have more edges resulting in a better opportunity for melting and complete fusing.

Add to this, uniform high quality, sturdiness of construction, an excellent protective coating and manufacturing to precision tolerances, and you soon discover why Milwaukee Chaplets are the favorite of the industry.

Motor Chaplets are available in round or square double heads from ⅜ " to 1" with the famous "thread" stem from 1/16" to ¼" in diameter.

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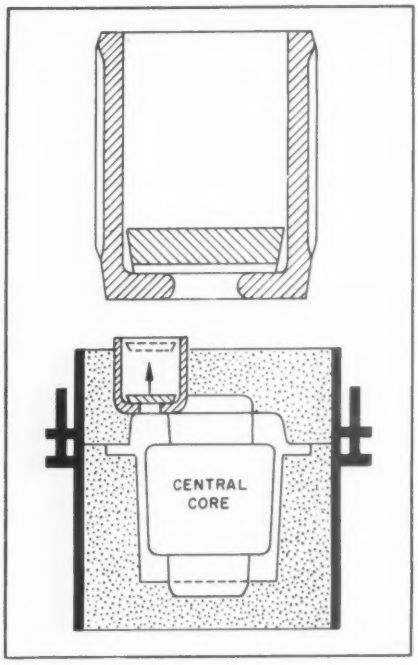
MILWAUKEE CHAPLET

Foundry Developments

By EDWIN BREMER

Metallurgical Editor

SWEDISH foundry, according to the Oct. 10, 1953 issue of *Gjuteriet*, Stockholm, has developed a combined skimmer or strainer pouring cup and feeder, as shown in the accompanying sketch. Cup or collar, made of baked oil-sand, contains an opening at the bottom of a size



suitable to the section of the casting where it is attached. A hexagonal strainer core covers the opening during pouring until the casting cavity is filled, and then rises with the metal in the cup—keeping the metal beneath it much hotter than if it were exposed to the atmosphere.

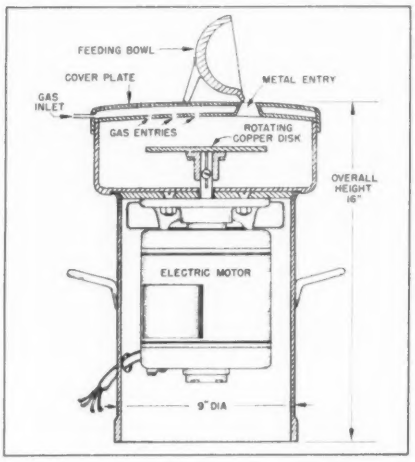
* * *

SOME experiments on the effect of surface rolling on the fatigue strength of 45° v-notch specimens (with 0.25-mm root radius) of a pearlitic flake graphite cast iron by G. N. J. Gilbert and K. B. Palmer are reported in the October, 1953 issue of the *Journal of Research and Development*, British Cast Iron Research Association, Birmingham, England. Roller pressures of 79, 138 and 264 lb were used, and the best results were obtained with the lower pressure, which did not cause any appreciable change in notch dimensions. With a pressure of 79 lb the fatigue limit, calculated on the basis of 20 million reversals of stress, was increased 20 per cent. Most significant effect of surface rolling was the very great increase in life obtained at stresses above the fatigue limit.

* * *

BRITISH Steel Castings Research Association has announced the successful development of a rotary metal sampling device for use in steel and iron foundries. Based on a design of the late S. Westberg, Rotherham, the device enables furnace samples of steel or other metals to be produced in finely granulated or divided form directly from the liquid state, by pouring the liquid sample onto a rotating copper disk. Disk centrifugally disperses the metal on the internal periphery of a surrounding metal bowl.

Prevention of oxidation necessary



during the sampling operation is achieved by providing a high-purity nitrogen or inert gas atmosphere in the dispersion cavity of the machine. Gas is admitted through a chambered coverplate shown in the accompanying illustration. Field trials have demonstrated reliability and correlation with analyses performed on orthodox drilled samples for normal as well as alloying elements. Device is being made and marketed by Westberg Developments Ltd., Rotherham, England.

* * *

CANADIAN foundry engaged in shell molding has developed a magnetic compacting device for backing up its molds with steel shot. It employs an alternating magnetic field which causes the shot to make intimate contact with the mold contours. On completion of backing up, the shot is subjected to a heavy surge of direct current which magnetizes it to such a degree that the resultant attractive forces between the shot on opposite sides of the mold push the two halves tightly together.

* * *

OXYGEN and nitrogen contents of gray irons and pig irons will vary over a wire range, according to an investigation on "Gas Analyses of Cast Iron Produced at Various Foundries" by B. B. Bach, as reported in the October, 1953 issue of the *Journal of Research and Development* published by the British Cast Iron Research Association, Birmingham, England. Some results obtained from 15 visits to foundries using widely varying melting techniques to make irons of considerably different compositions show oxygen contents between 4 and 100 parts per million and nitrogen contents between 15 and 140 parts per million.

It appears that the highest O and N are obtained in cupola melting, although they are not necessarily obtained in that way. In cupola-melted iron high O and N contents are obtained more easily the lower the Si and/or C contents. Use of hot blast does not necessarily give higher O and N contents than are obtained with cold blast. O content of acid cold-blast cupola metal can differ in foundries producing iron of similar compositions.

* * *

SCOTTISH foundry has developed a permanent mold process for production of cast iron rain gutters (eaves troughs). It employs a male die which is pressed into molten metal contained in a female die to form the casting. Both dies are smoked to provide an insulating carbon coating, which is said to give a superior surface finish. Electric control panel sets in motion a controlled sequence of operations of moving the top or male die down, holding in that position for a definite period, opening or raising the top die, and indicating when the casting is ready for removal from the female die.

Important low-friction bearing development for conveyor rolls.

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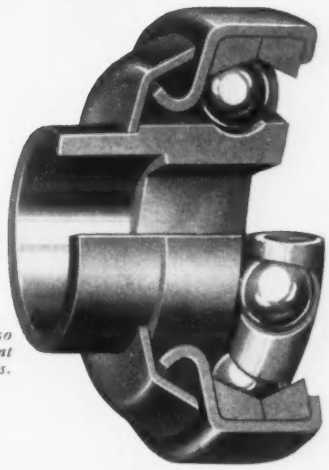
NOTE THE DIFFERENCE

CONVENTIONAL TYPE BALL BEARING. Arrows in this illustration indicate the unavoidable friction when the balls are in contact with each other.

LOGAN X-SERIES BALL BEARING. Balls are caged in a steel container. Binding and friction caused by balls contacting each other is eliminated.



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Activities of Foundry Groups

Washington

SPEAKER at the November meeting of Washington Chapter of the AFS was R. L. McIlvaine, National Engineering Co., Chicago, whose topic was "Layout and Mechanization of Foundries." Principal idea of his presentation was that although layouts and plans of mechanized installations differ, the details for all are similar.

He analyzed hopper design and gates for hoppers, also the shakeout. The hopper below the shakeout should hold more sand than any flask to be shaken. If the hopper becomes too full, the sand will pack and there will be delay while the sand is dug out. Pits in which people have to do service work should be designed large enough to work in or to facilitate easy removal of equipment.—*E. F. Reidle, Puget Sound Naval Shipyard.*

Texas

A JOINT meeting of Texas Chapter of the AFS and the Houston Chapter of the Non-Destructive Testing Society was held Oct. 16 at Kaphan's in Houston. Attendance of 115 persons was divided about equally between members of each group. Speaker was A. L. Pace, X-Ray Department of General Electric Co., Milwaukee, who illustrated his presentation with slides.

There were 51 members and their guests present at the Nov. 16, 1953, meeting of the San Antonio section of Texas Chapter of AFS. The group met at the Alamo Iron Works, San Antonio, where a film entitled "Economical Shell Molding" was presented by Alex Bearden of M. A. Bell Co.—*W. A. Bearden and E. W. Pruske, Alamo Iron Works.*

Western New York

SPEAKER at the November meeting of Western New York Chapter of the AFS was Donald L. Hayes, Laverack & Haines Inc., Buffalo. He discussed "Compensation Picture as Applicable to the Foundry Industry." According to the speaker, three of the

(*Continued on page* 180)

TEXAS Chapter of the AFS met Sept. 25 at the Menger Hotel, San Antonio, Tex., and Oct. 16 at Kaphan's, Houston, Tex. Views at the top are from the September meeting, those at the bottom from the October meeting. Left to right, top, are Chapter Chairman Israel Smith, Western Foundry Co., Tyler, Tex.; Joe Younggren, San Antonio Machine & Supply Co., San Antonio; Pat Fowler, Texas Steel Co., Fort Worth, Tex.; Ted Kerr, Texas Steel Co.; Henry W. Creeger Jr., Electro Refractories & Abrasives Corp.; Elmore C. Brown, Whiting Corp., Houston, chapter secretary; and David K. McKie, Tyler Pipe & Foundry Co., Tyler, chapter treasurer. From left to right, bottom views, are A. L. Pace, X-Ray Dept., General Electric Co., speaker. Edward W. Wey, Dee Brass Foundry Inc., Houston, chapter vice chairman; William M. Ball Jr., R. Lavin & Sons Inc., Chicago; Pete Maenza and Jack Calhoun, Dee Brass Foundry Inc.; F. M. Wittlinger and C. Eugene Silver, Texas Electric Steel Castings Co., Houston; Jake Dee, Dee Brass Foundry Inc., and Gale Smith, Byron Jackson Co., Houston

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(*Continued from page* 178)
serious problems facing the industry at present are silicosis, partial loss of hearing due to industrial noises and increasing compensation.

Mr. Hayes stated that it seems some employers are living in the past, in that intrepretation of compensation laws is becoming more liberal. He urged that state legislation on compensation be watched closely. Some proposed legislation presents angles which if put into effect would cause actual dollar loss to employers.—*R. E. Walsh, Hickman, Williams & Co.*

Pittsburgh

MORE than 170 members and guests of the Pittsburgh Foundrymen's Association, the best turnout of the year, gathered at the Webster Hall Hotel, Pittsburgh, for the Nov. 16 meeting.

Harold Gassner, Rosedale Foundry & Machine Co., recently elevated from vice president to president of PFA through the transfer of F. H. Reuwer to the Attica, N. Y. plant of Westinghouse, presided at the business meeting which followed dinner. He presented each of the association's past presidents with a gift. Among these were H. P. Spoker, PFA president, 1906-07 and H. E. Field, president in 1907-08.

The meeting's featured speaker was William B. George, R. Lavin & Sons Inc., Chicago. His address was titled "Why Castings Are Lost." Mr. George paused frequently for questions from the audience and illustrated main points with drawings.

One of these was a description of the beginning and ending of solidification of a bronze casting in which he stressed the importance of directional solidification at the proper rate of speed. "Large bronze castings require careful mathematical planning," the speaker stated. "Directional solidification must be controlled at the right rate of speed, within seconds, not minutes. Ignoring the rate of solidification and temperature control is dangerous."

Three basic points in good castings are: Understanding grain structure; how to heat and cool castings; and proper furnace design, the distance between cover and crucible being as close as possible.

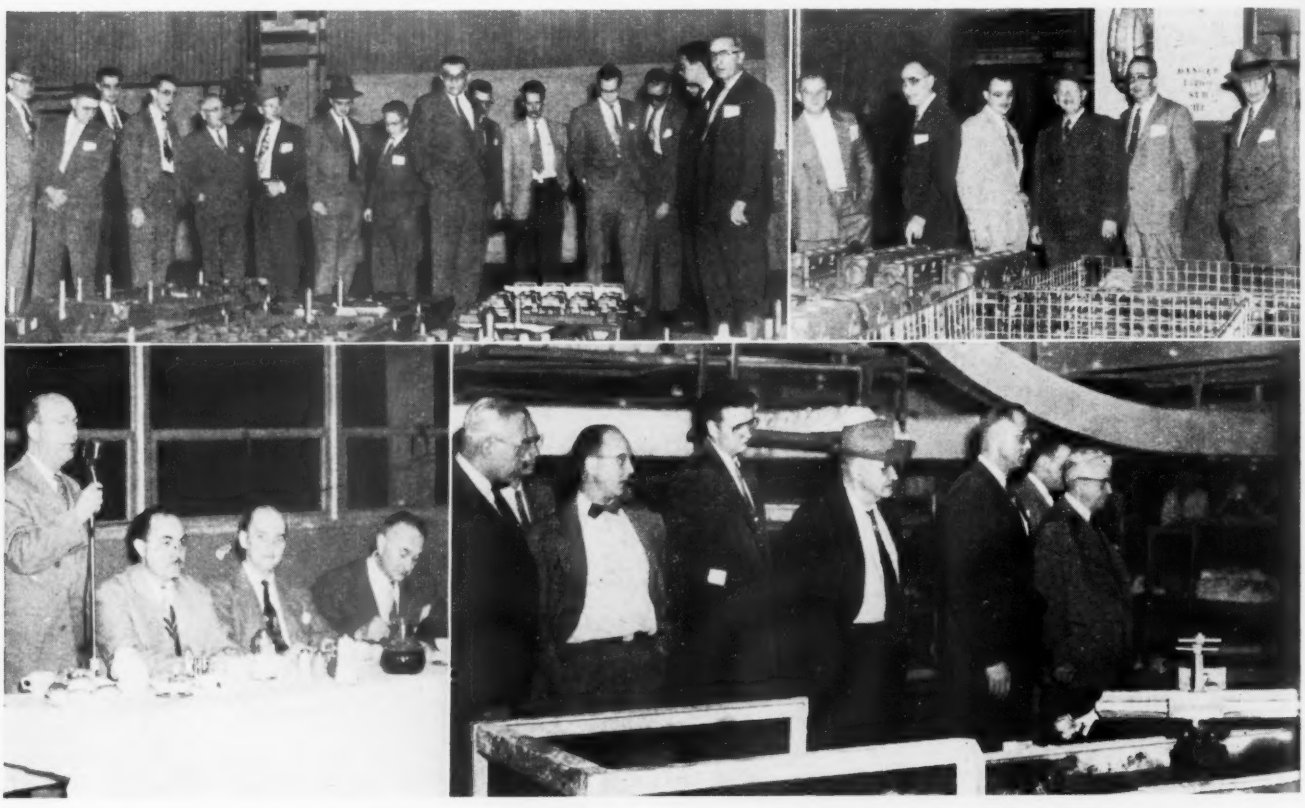
Other causes of losing castings which Mr. George mentioned were differences in cooling rates between parts of a casting; slag remaining in an old pouring ladle, melting and coming up through the casting. Insufficient drying of ladles also causes bad castings.—*Robert Love*

Wisconsin

MEMBERS of Wisconsin Chapter of the AFS met at Hotel Schroeder, Milwaukee, on Nov. 13. Following dinner the group divided into five sections. Those interested in nonferrous practice heard R. L. Smith, Federated Metals Division, American Smelting & Refining Co., talk on "Some Fundamental Properties Affecting Copper-Base Alloys." C. Van Buren, Lawran Foundry Co., Milwaukee, served as chairman with O. Sadofsky, Kenosha Brass & Aluminum Foundry, Kenosha, Wis.

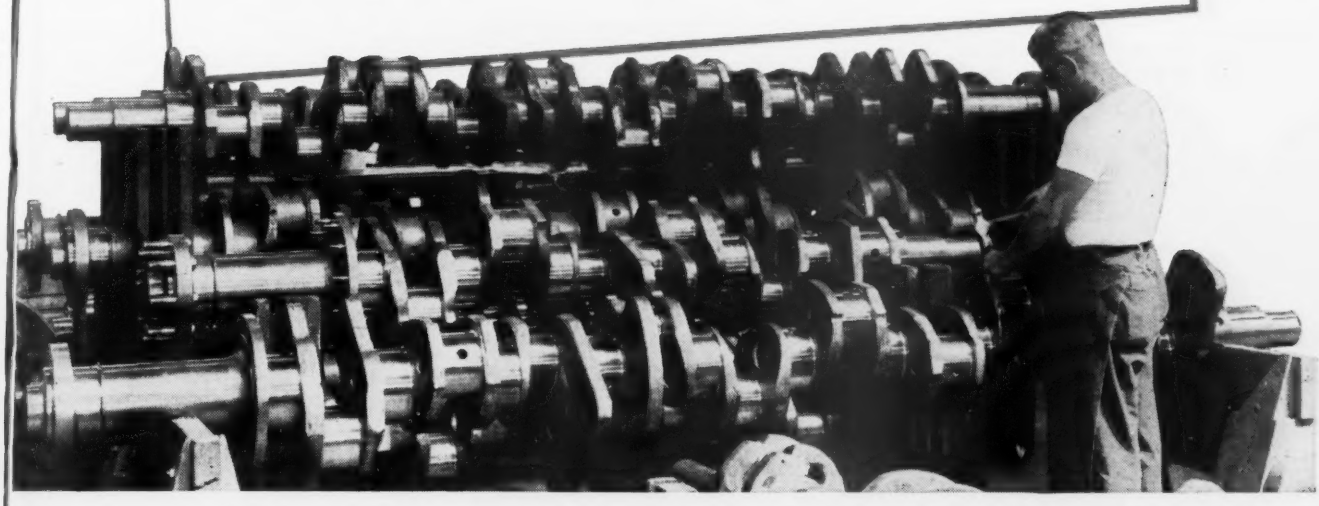
Guy Pealer, General Electric Co., Elmira, N. Y., spoke to the pattern-

(*Continued on page* 182)



NORTHEASTERN OHIO Chapter of the AFS made a tour of the Ford Cleveland Foundry on Nov. 16 instead of holding its regular monthly meeting. The event was sponsored by the Patternmakers' Division of the chapter and was limited to 400 persons. Dinner in the plant cafeteria preceded the tour, and the Ford Motor Co. donated the more than $1000 collected for the dinner to the chapter for its educational fund. Members were divided into groups of about 20, each group guided by a Ford representative. Top views and the right view below show various groups at different points on the trip. Left view below, left to right, are E. C. Jeter, plant manager; John Roth, Cleveland Standard Pattern Works; David Clark, Forest City Foundries, chapter vice president; and Frank Cech, Cleveland Trade School, chapter director and immediate past chairman. Top views are by Thomas W. Gallagher, Lake City Malleable Co., Cleveland; bottom views are by the Ford Motor Co. staff photographer

FAIRBANKS-MORSE uses CHATEAUGAY PIG IRON



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REPUBLIC STEEL

WISCONSIN Chapter of the AFS presented five sectional meetings for the pleasure and information of its membership at the Nov. 13 meeting, at the Hotel Schroeder, in Milwaukee. The general subjects discussed included copper-base alloys, patternmaking, nondestructive testing, gray iron and sand. Some of the members and guests who attended the talks after dinner are shown above. Photographs are by courtesy of Walter V. Napp, Delta Oil Products Co.

(*Continued from page* 180)

makers. His subject was "Pattern Engineering and Co-ordination of Methods To Produce Better Castings." H. W. Stokes, Waukesha Foundry Co., was chairman and H. F. Arneson, Spring City Pattern Works, Waukesha, Wis., was co-chairman.

One of the most interesting discussions was on nondestructive testing. Speakers included: Al F. Cota, A. O. Smith Corp., who reviewed, "Non-Destructive Testing— Its Applications and Limitations"; Bruce Norrice, Allis-Chalmers Mfg. Co., spoke on "Betatron and Magnaflux"; Clyde A. Ferguson, Ladish Co., on "Ultrasonic Testing"; and Ralph Sloane on "Penetrants." Walter Brandt, Pelton Steel Casting Co., Milwaukee, was chairman, with Anthony Herrmann, Racine Steel Casting Co., Racine, Wis., co-chairman.

Speakers for the gray iron group were Kenneth M. Smith and Carl E. Rowe, Carl E. Rowe Co., Milwaukee, who talked on "Practical Quality Control for the Foundry." T. H. Tanner, Zenith Foundry Co., Milwaukee, was chairman and Eric Wussow, Kaukauna Machine Corp., Kaukauna, Wis., was co-chairman.

Sand practice was considered by those in the malleable group. Earl E. Woodliff, foundry sand engineer, Detroit, was the speaker. D. Feather, Appleton Electric Co., Appleton, Wis., was chairman and F. E. Katsenski, International Harvester Co., was co-chairman for the group.—*John E. Hubel*

Central New York

IN SPITE of superstitious forebodings, 93 members of Central New York Chapter of the AFS met on Friday, Nov. 13, at the Onondaga Hotel, Syracuse, N. Y. John A. Feola, Crouse-Hinds Co., Syracuse, N. Y., chapter chairman, presided.

Robert H. Zoller, president of Zoller Casting Co. and also Melting Research Inc., Bettsville, O., was the speaker. His talk was entitled, "Let Slag Be Your Refractory," in which he described a new method of cupola melting and control of product. Dampness is eliminated by starting with a hot cupola and the cupola is operated with the tuyeres always open. Dropping the cupola bottom only once a week minimizes maintenance. (An article describing this practice appears in FOUNDRY, September 1953, p. 124.)

Harold Brakeman, City Pattern Works, Syracuse, arranged an excellent patternmaking session with Cecil L. Sims, president, Sims Match Plate Co., Syracuse, as speaker. Pat-

(*Continued on page* 185)

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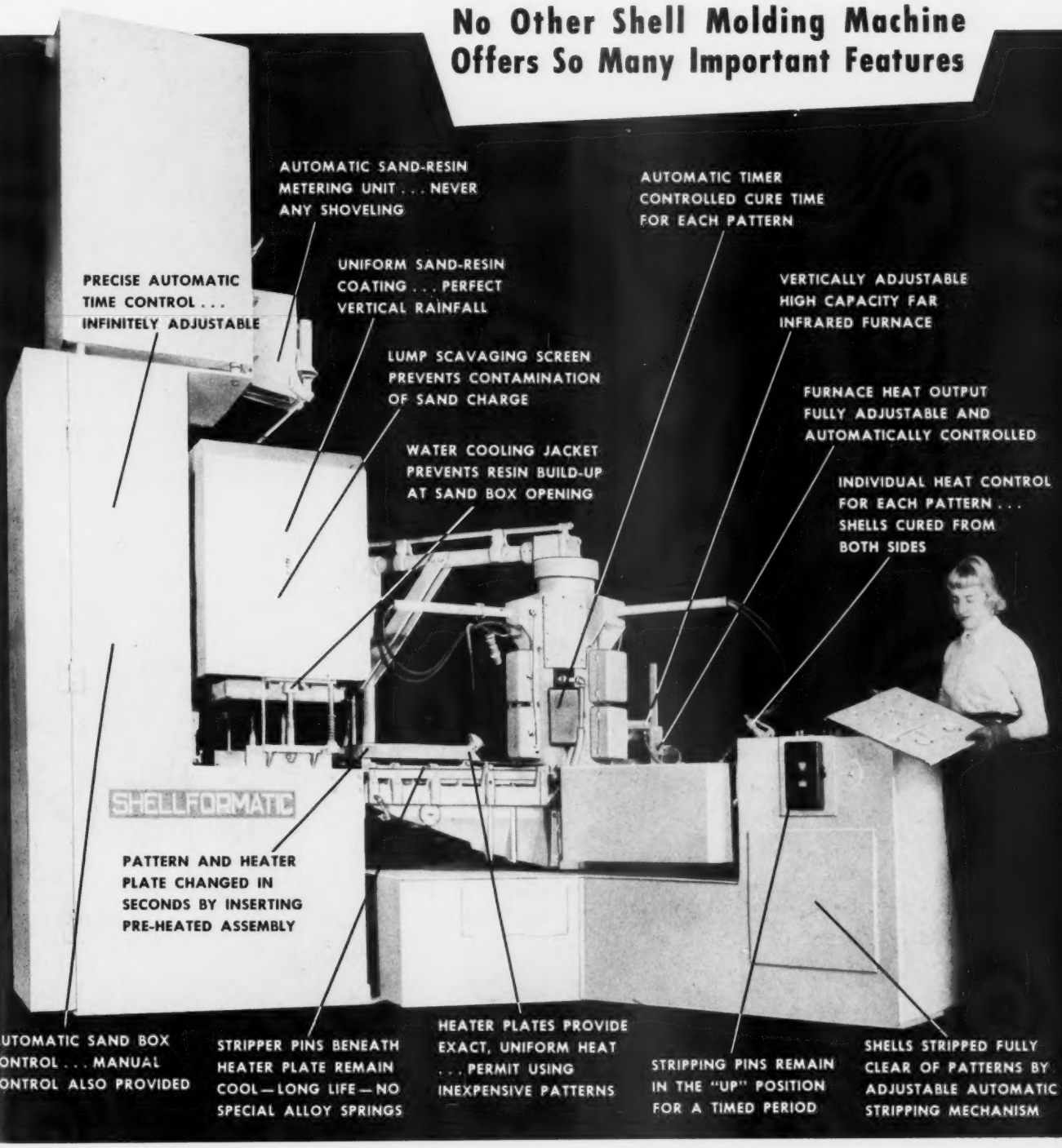
No Other Shell Molding Machine Offers So Many Important Features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For full information on Shellformatic single or multiple pattern types, and other advanced shell molding equipment, write to the Shell Mold Dept., *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39.*

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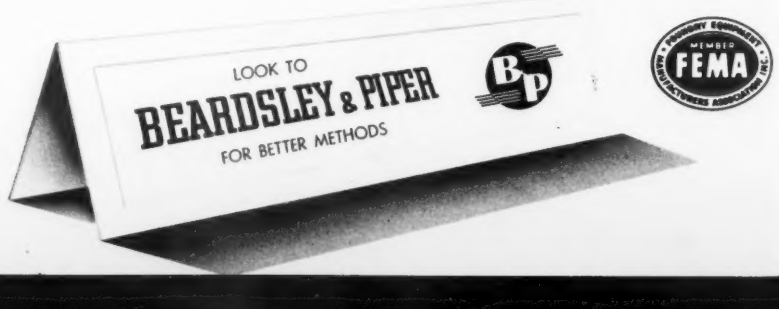

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tern problems as applied to both foundries and pattern shops were discussed and a group of high-precision castings made in plaster was displayed. It was pointed out that castings produced can be no better than the tools provided and that there is no such thing as a good, cheap pattern.—*Bruce R. Artz, Pangborn Corp.*

St. Louis

A HUMOROUS account of his experiences while visiting in Europe during the past summer was presented by Dr. Albert Schlechten at the November meeting of St. Louis District Chapter of the AFS. The speaker is chairman of the Department of Metallurgical Engineering, Missouri School of Mines and Metallurgy, Rolla, Mo. He was invited by the Organization for European Economic Co-Operation to travel with European metallurgists to study and learn about the low-grade ore deposits, research facilities, educational facilities and engineering methods and operations.

Dr. Schlechten visited plants in England, Sweden, France, Germany and Italy. He reported that much of the machinery and equipment he saw was antiquated and in his opinion there is not much for Americans to learn from the engineers in Europe. However, he stated they are a spirited and enthusiastic people. — *Howard Palmer, American Manganese Steel Division, American Brake Shoe Co.*

Chicago

ROUNDTABLE meetings continue their popularity with the Chicago Chapter, AFS. Second of four for the current season was held Dec. 7 at the Chicago Bar Association and attendance exceeded 230.

Chapter President John A. Rassenfoss, assistant research director, American Steel Foundries, conducted the business portion of the meeting immediately following dinner. He announced that Deming H. Lucas, manufacturers' representative, was relinquishing chairmanship of the Membership Committee after 12 years of faithful service and for the latter was deserving of recognition and gratitude from the chapter.

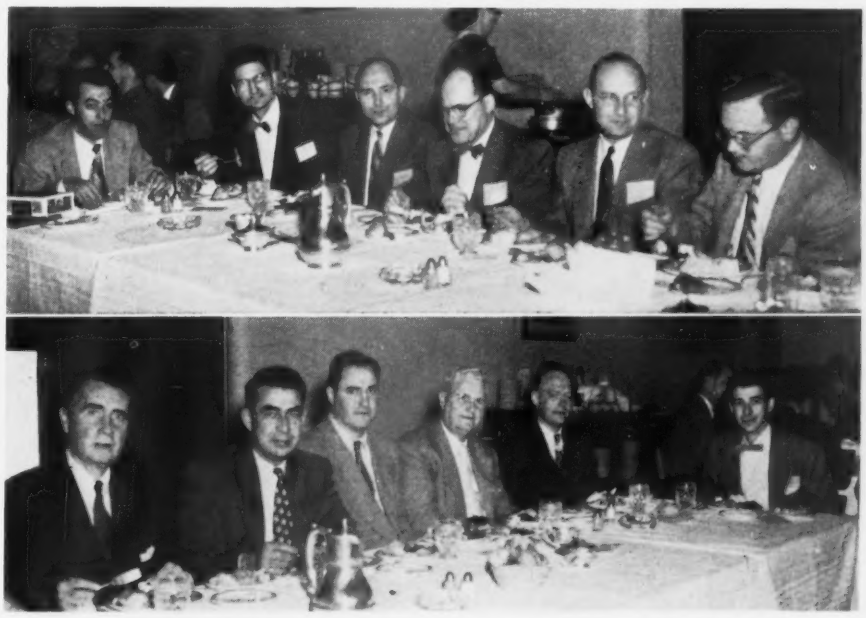
A new membership committee arrangement is being adopted, President Rassenfoss said. Henceforth, there will be a director of membership who is a member of the board of directors. Reporting to him will be six group chairmen representing a sales division, and pattern, steel, gray iron, malleable and nonferrous divisions. Director of membership for 1953-54 is J. E. Johnson, general superintendent, Continental Foundry & Machine Co.

ST. LOUIS Chapter of the AFS was visited at its Nov. 12 meeting by four faculty members of the Missouri School of Mines and Metallurgy, Rolla, Mo. From left to right, they are Adolph Legsdin, professor of mineral dressing; R. V. Wolf, instructor of metallurgical engineering; A. W. Schlecten, chairman, department of metallurgical engineering, who was guest speaker at the meeting; and D. S. Eppelsheimer, professor of metallurgical engineering

With four roundtable sessions scheduled for the evening, Chapter Vice President Robert L. Doelman, sales engineer, Miller & Co., introduced the chairmen and asked each to announce the program arranged and to introduce the participants.

Gray iron and malleable divisions combined their efforts to hear Lyle Clark, supervisor of foundry research, Armour Research Foundation, speak on "How To Control a Cupola from the Standpoint of Analysis and Temperature." Robert A. Aeberly, technical sales and service, Electro Metallurgical Co., division of Union Carbide & Carbon Corp., was chairman and J. W. Giddens, Armour Research Foundation, was co-chairman.

Nonferrous and pattern divisions also joined for consideration of "Use of Magnesium for Patterns and Coreboxes," with Peder Moluf, engineer of the technical service group, Dow Chemical Co., Midland, Mich., as speaker. Robert F. Dalton, superintendent, Electronicast Inc., and Robert



CHICAGO Chapter of the AFS met Nov. 2. Left to right at the speaker's table are William Rudin, Elesco Smelting Co.; Robert Dalton, U. S. Gypsum Co.; Kenneth Smith, Chicago Malleable Castings Co.; Earl Woodliff, Foundry Sand Service Engineering Co., Detroit, speaker; Robert Aeberly, Electro Metallurgical Co.; R. L. Doelman, Miller & Co., chapter vice president; A. Lesley Gardner, Pangborn Corp., Hagerstown, Md., speaker; Harold Rekart, National Malleable & Steel Castings Co.; Robert Rich, American Wheelabrator & Equipment Corp., Mishawaka, Ind., speaker; Robert Hendry, Love Bros. Inc.; Stanley Wilcox, White Pine Lumber Co., speaker; and George Disylvestro, Burnside Steel Foundry Co. Photos by courtesy of Fred Ridenour, Whiting Corp.

ROCHESTER Chapter of the AFS met Nov. 10. Left to right are Verne Patterson, Climax Molybdenum Co., Detroit, speaker; Edward Hoenicke, Eaton Mfg. Co., Saginaw, Mich., national director of the AFS; and Duncan Wilson, Engineered Castings Div., American Brake Shoe Co., chapter secretary-treasurer

Hendry, foundry superintendent, Love Bros. Inc., were chairman and co-chairman, respectively.

"Shakeout Operations and Maintenance" was the subject pursued by the maintenance division, with George Posanke, assistant superintendent of shop maintenance, Crane Co., as speaker. Harold Rekart, plant engineer, National Malleable & Steel Castings Co., was chairman.

Steel division conducted a panel discussion on "Steel Foundry Problems," with Roy C. Nelsen, district manager, Sterling Wheelbarrow Co., presiding. Panel members included Edward Gricus, foundry foreman, Link-Belt Co., and George DiSylvestro, foundry technician, Burnside Steel Foundry Co., and John Mulholland, chief metallurgist, Pettibone-Mulliken Corp.

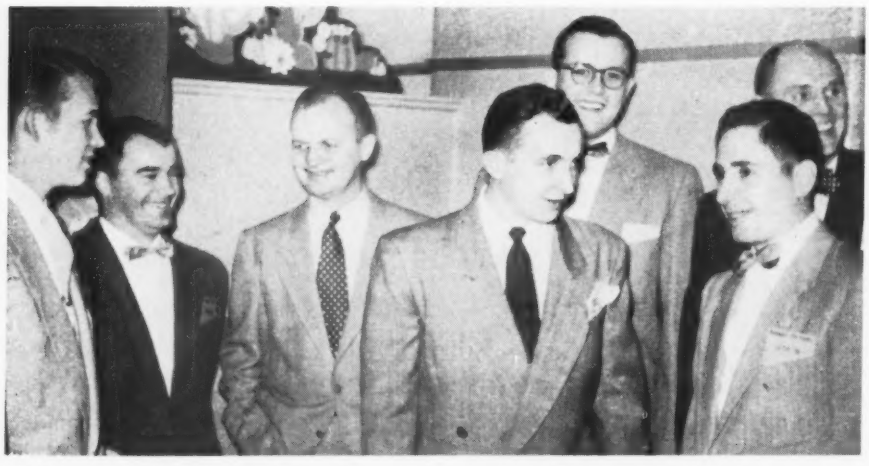
Roundtable sessions also are scheduled for the next chapter meeting on Jan. 4. Malleable, gray iron and pattern divisions will combine to consider "Foundry Mysteries"; maintenance division will center attention on "Molding Machines"; nonferrous division will discuss "Fracture Test Report"; and steel division will conduct a panel discussion on an unannounced subject.—*Erle F. Ross*

Rochester

AT THE Nov. 10 meeting of Rochester Chapter of the AFS, Verne H. Patterson, Climax Molybdenum Co., Detroit, spoke on "The Metallurgy of Cast Iron." Special guest at the meeting was national AFS director E. C. Hoenicke, Eaton Mfg. Co., Detroit.

Mr. Patterson divided his talk into four parts and used slides for illustration. He first stressed the importance of the design of the casting to be made. In his opinion this is an important factor in the quality of the casting to be produced. Other important factors are proper control of temperatures and the additions of alloys in bringing about high-strength irons.

In laboratory tests it has been proved that tensile strengths of 90,000 psi have been developed. Also proved is that carbon is the important factor in the production of high-grade iron. High-carbon irons under test have shown 29,300 psi whereas low carbons of the same mixtures have been tested at 59,000 psi. Pouring temperatures affect the strength of the iron, and tests show that in most instances the ideal pouring temperature is 2650° F.—*H. G. Stellwagen, Hetzler Foundries Inc.*



TWIN CITY Chapter of the AFS was host to 43 students and faculty members from local universities and vocational schools at its Nov. 10 meeting. The night was planned and directed by the chapter's educational committee, four members of which are shown above with three University of Minnesota students. Third, fourth, fifth and seventh from left, respectively, members are R. W. Wilson, American Hoist & Derrick Co.; J. D. Johnson, Archer-Daniels-Midland Co., chairman; Don B. Fulton, Northern Malleable Iron Co., assistant chairman; and John S. Tiedeman, Minneapolis Moline Co., secretary

Twin City

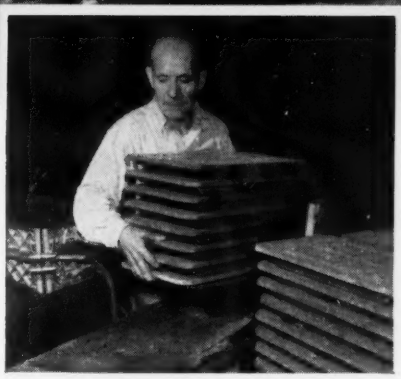
STUDENTS held the limelight at the Nov. 10 meeting of Twin City Chapter of the AFS. Local universities and vocational schools were represented by 43 students and faculty members. Each guest was sponsored by a local foundry, and chapter members acted as hosts.

The Educational Committee, under the chairmanship of J. D. Johnson, Archer-Daniels-Midland Co., planned and directed the meeting and Don B. Fulton, Northern Malleable Iron Co., arranged the program. As a means of interesting students in the area in foundry work and also to make known the importance of the foundry industry to our economy, members of the Educational Committee are accepting invitations to speak before schools in connection with vocational guidance programs. For those students actively interested in the industry, plant visits have been arranged.

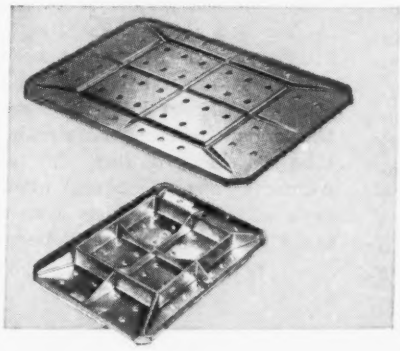
Hans Heine, acting technical director of AFS, interested members and students alike by his presentation, "The Fascination of the Foundry." Mr. Heine characterized a man destined for success as one whose interests are not limited to the narrow confines of his job. He is civic minded; he is aware of current technological and sociological developments, and, most important, he is able "to think for himself." Although zealous in his own beliefs this man is tolerant of the viewpoints of others.

To illustrate that the foundry can be the place to realize one's goals

(*Continued on page* 188)



Molder finds EDCO Dowmetal Bottom Boards are light, easy to handle and stack.



"We cut our board losses from 7500 down to 12 . . . by switching to EDCO Dowmetal Bottom Boards"

— *says R. D. BAYSINGER, Manager, Foundry Division*
GREENLEE BROS. & CO., ROCKFORD, ILLINOIS

Analysis of five-year records at the Foundry Division of Greenlee Bros. & Co. revealed a loss of only 12 Edco Dowmetal Bottom Boards, in contrast to a normal loss of 7500 wood boards during the same period of time.

"Further," says Baysinger, "we estimate *our scrap loss has been cut 20% since switching to Edco.*" Benefits like these are typical. For example, another Edco user commented, "Our old wood boards had a life of about two weeks; and toward the end of their life-span, they always produced some poor castings which had to be rejected." Edco Dowmetal Bottom Boards are different: they stand up under constant use . . . and keep casting quality up, too.

Add to this the fact they are light, easy to handle—stack in small space, easily and securely—and you'll see why it's "good business" to switch to Edco.

Write us, or phone CApitol 7-2060 for price schedule and list of 78 standard sizes available from stock.

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ALUMINUM ALLOY INGOTS

ONTARIO Chapter of the AFS heard W. L. Seelbach, president, Superior Foundry Inc., Cleveland, and past president of the AFS, discuss "What the American Foundrymen's Society Can Do for the Management of a Foundry" at its Oct. 30 meeting. Members of sister societies also were present at the meeting, which was held at the Royal Connaught Hotel, Hamilton, Ont. From left to right are Mr. Seelbach; Reg. Williams, Canadian Westinghouse, past president of the chapter; Chapter Chairman Alex Pirrie, Dominion Radiator Co. Ltd. (partially concealed behind the lectern); and C. E. Maddick, Massey-Harris-Ferguson Ltd., who was the technical chairman of the meeting

(*Continued from page* 186)

the speaker presented slides showing various phases of foundry work and also motion pictures produced by Ford Motor Co., showing operations at its aircraft plant and its Cleveland foundry. In conclusion, Mr. Heine stated that "there will always be a job for the man who does not punch a mental time-clock."—*R. J. Mulligan, Archer-Daniels-Midland Co.*

Southern California

AN open discussion on problem castings was held by 160 members of Southern California Chapter of the AFS at the Rodger Young Auditorium, Los Angeles, on Oct. 9. The discussion panel included Henry W. Bowers, works manager, Rich Mfg. Co.; Frank C. Warga, foundry manager, AiResearch Mfg. Co.; Anthony Tuzzolino, foundry superintendent, Overton Foundry; William C. Baud, plant superintendent, Mechanical Foundries Division, Food Machinery & Chemical Corp.

Ferrous and nonferrous castings and the difficulties they present were discussed by the panel members, and solutions for some of the production problems encountered were offered by various foundrymen in the audience on the bases of their personal experiences with them. A lively discussion along these lines followed the presentation of each one of the speakers, and a great deal of practical information was offered.

A new record turnout of 160 members and guests was present for the Nov. 13 meeting of Southern California Chapter of the AFS. Meeting was held at the Rodger Young Auditorium, Los Angeles, with R. L. McIlvaine, vice president and sales manager, National Engineering Co., Chicago, as speaker. His topic was "Design Details of Sand System for Small Foundries."

Mr. McIlvaine called attention to the small but very important details which are often overlooked. In many cases these prove costly in poor operation and high cost of maintenance. —*Otto H. Rosentreter, Osborn Mfg. Co.*

Lehigh

ON OCT 14 Dr. William E. Levy, executive director, National Foreman's Association, spoke at the first technical meeting of the season of the Lehigh Valley Foundrymen's Association, held at Lafayette College, Easton, Pa. His subject was "Management Must Be a Profession," which was well received by approximately 140 foundrymen from the area.

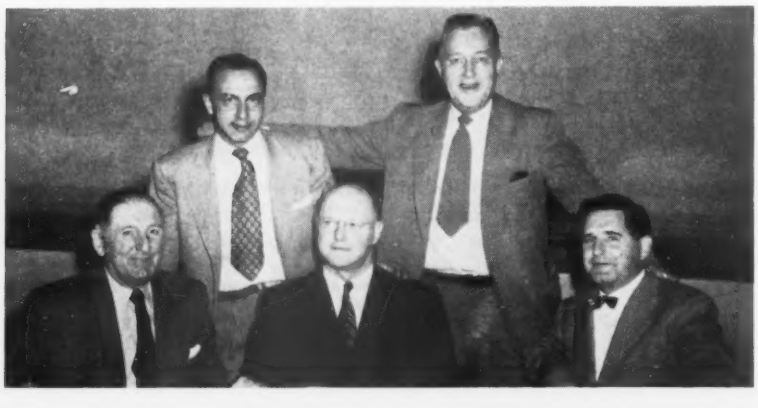
Raymond Morrow, general foreman, Ingersoll-Rand Co., Phillipsburg, N. J., chairman of the association, presided. Other officers are: Richard H. Dawe, general manager, Bridesburg Foundry, Fullerton, Pa., vice chairman; Wylie J. Childs, associate professor of foundry metallurgy, Lafayette College, secretary-treasurer. A dinner preceded the meeting. At the coffee talk, Dr. Steve Hakuf, football coach spoke on "Football at Lafayette."—*Wylie J. Childs, Lafayette College.*

Connecticut Non-Ferrous

MEMBERS of Connecticut Non-Ferrous Foundrymen's Association assembled on Nov. 18 at the Garde Hotel, New Haven. Featured speaker was Warner B. Bishop, manager, Foundry Products Division, Archer-Daniels-Midland Co., Cleveland, who described the "D" process of shell molding.

The process differs from the regular method of shell molding in that little special equipment is needed beyond that normally found in a sand foundry. Essentially it consists of blowing mold halves on standard core blowers using a fine, dry sand to which a special liquid binder has been added. The binder is an oleoresinous mixture which has been devel-

(*Continued on page* 190)

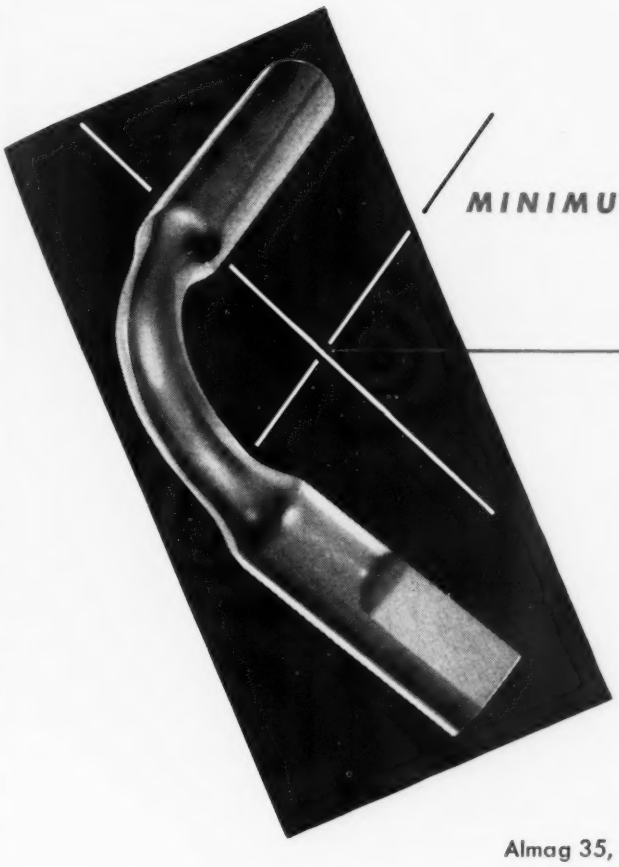


SOUTHERN CALIFORNIA Chapter of the AFS met Nov. 13 at Rodger Young Auditorium, Los Angeles, to hear R. L. McIlvaine, vice president and sales manager, National Engineering Co., Chicago, deliver an address entitled "Design Details of Sand Systems for Small Foundries." From left to right in the back row are William C. Baud, Mechanical Foundries Division, and H. W. Bowers, Rich Mfg. Co. From left to right in the front row are Robert Gregg, Reliance Regulator Division, American Meter Co.; Mr. McIlvaine; and Charles Gregg, Gregg Iron Foundry. Photographs are by the courtesy of K. F. Sheckler, Calmo Engineering Co.

MATCHLESS QUALITY • NO PREMIUM

ALMAG 35

ALUMINUM ALLOY



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with No Heat Treating — Age Hardening

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Charpy Impact — 10.47 ft. lbs.
Tensile Strength — 37,000 to 40,000 psi.
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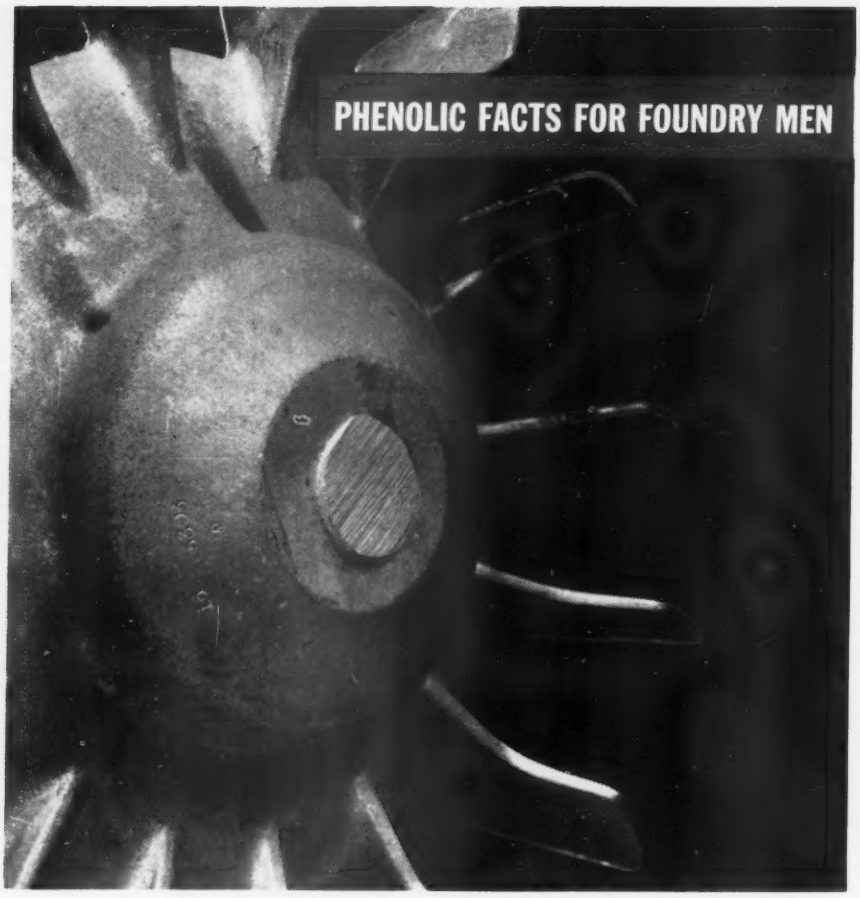

Stronger shell molds...finer castings

Stepped-up cycles . . . Faster curing, more rigid, more warp-free shell molds can now be produced by using a new phenolic bonding resin developed by Durez. Whether or not you are using automatic equipment, the new resin enables you to turn out more molds per hour with no loss of quality in structural strength and gas-venting properties. Because of the greater hot rigidity, mold distortion is reduced. This results in greater dimensional accuracy in the casting, particularly at the parting line.

Less finishing . . . Pieces are cast to closer tolerances in shell molds bonded with our new resin. Castings have clean surfaces of almost pattern smoothness, require minimum finishing.

Where to use . . . Shell molding has proved to be economical on high production jobs as well as comparatively short runs. Gears, fittings, and other parts for industrial equipment and appliances are being cast with impressive savings in cost . . . and in various metals.

Have you read the new "Guide to Shell Molding"?

The most complete and up-to-date publication of its kind . . . 40 pages of practical information prepared by Durez to serve you in shell molding evaluation and application. Covers equipment, methods, procedures. For your copy...

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(*Continued from page* 188)

oped by ADM.

Savings claimed for the process include the fact that little special machinery, no pattern heating and no special release agents are required.—*John V. McCarthy, North American Smelting Co.*

Tennessee

A TALK on "Human Engineering" was featured at the Nov. 20 meeting of Tennessee Chapter of the AFS which was held at Hotel Patten, Chattanooga. William P. Delaney, Eureka Foundry Co., chapter chairman, presided. There were 125 members and guests present.

The speaker, William Ball Jr., R. Lavin & Sons Inc., drew upon his wealth of experience in the industry to present actual examples of the vast possibilities available in human engineering.

Paul Arnold, resident manager, U. S. Pipe & Foundry Co., and chairman of the Southeastern Regional Conference to be held in Chattanooga in February, reported on plans for the conference which he promised would be both educational and enjoyable.—*W. F. Hetzler, Eureka Foundry Co.*

Mo-Kan

REGULAR meeting of Mo-Kan Chapter of AFS was held Nov. 11 in the special dining and meeting room of Fairfax Airport Restaurant, Kansas City, Kans. A large attendance of both members and guests enjoyed an interesting talk, "Baked Cores while You Wait," which was given by W. M. Peterson, chemist with M. A. Bell Co., St. Louis.—*C. W. Boettcher, Black, Sivalls & Bryson Inc.*

Northwestern Pennsylvania

MEETING in the Erie Moose Club on Oct. 26, members of Northwestern Pennsylvania Chapter of the AFS had as their speaker Norman A. Birch, who discussed "Principles of Gating." During the business meeting it was announced that John Clark, General Electric Co., Earl Strick, Erie Malleable Iron Co. and a member of the national AFS Educational Committee and Charles Gottschalk, Cascade Foundry and chapter chairman, have been asked to serve on the advisory board for the new million dollar technical high school to be built in Erie. The school will offer a foundry practice course and will have a modern foundry as one of its facilities.

Robert W. Jordan, Ajax Iron Works, and entertainment chairman, obtained and presented the Beardsley & Piper motion picture on improve-

ment of material handling in the foundry.

The speaker, Mr. Birch, general superintendent of foundries, National Bearing Division, American Brake Shoe Co., Meadville, Pa., did not discuss how jobs should be gated but rather suggested methods in gating and risering castings to achieve best results as to sound castings and high yield. Also, he advised that a complete record of procedures used in gating and feeding each particular casting is most advantageous.—*Roy A. Loder, Erie Malleable Iron Co.*

Central Michigan

MORE than 150 members and invited youngsters were on hand for the Central Michigan Chapter of the AFS annual Youth Encouragement night. Meeting was held in the main ballroom of the Hart Hotel, Battle Creek, Mich.

Wally Weber, freshman coach at the University of Michigan, who is known as "Football's Wizard of Words," not only fascinated his audience with his facility with words but also showed films of the Michigan-Pennsylvania football game.

Following Mr. Weber, Arthur Clark, manager of manufacturing engineering for Ford Motor Co., presented the Ford film "Technique for Tomorrow" showing operations at the company's Cleveland foundry and engine plant.—*Robert Dodge, Archer-Daniels-Midland Co.*

Chattanooga To Be Site of Southeastern Conference

The annual Southeastern Regional Foundry Conference moves to Chattanooga, Tenn., this year for the first time. Transfer from the traditional site of Birmingham reflects the fact that for the last two years the Tennessee Chapter of the American Foundrymen's Society has joined with the Birmingham District Chapter in sponsoring the event.

University of Alabama student chapter also will be co-operating in this 22nd annual gathering, scheduled for Feb. 18-19 at the Patten Hotel. The conference will be under the general chairmanship of Paul L. Arnold, resident manager, United States Pipe & Foundry Co., Chattanooga.

The two-day program includes nine technical sessions, plant visitations on Friday morning and a banquet that evening. District plants to be open for inspection include Eureka Foundry Co., Harriman Mfg. Co., Mueller Co., Ross-Meehan Foundries Inc., Somerville Iron Works, Southern Shell Mold Equipment Co., Strick-

High scrap loss and clean-up cost
(cast in green sand)
Clean-up down, No scrap loss
(cast in shell molds)
Shell molding success with MAGNESIUM... and DUREZ Resins!
Photos courtesy Utica Radiator Corporation

Magnesium is now being added to the list of metals that can be cast profitably in shell molds. Mixtures of Durez phenolic resin and sand, with suitable inhibitors to prevent burning, produce shells in which magnesium castings are molded successfully.

Better Castings at less cost resulted when shell molding replaced the green sand method in this example. Misruns which previously had caused high scrap loss were eliminated. Rough surfaces and parting-line fin that made clean-up costly were replaced by surfaces so smooth that no finishing was necessary after shakeout. No backing and no risers are needed in this job. The Durez bonded shell molds vent gases rapidly, help to assure the desired structural qualities and dimensional accuracy of the castings.

Let Durez help you profit by the numerous economies of shell molding in adapting it to jobs for which it is the best method. Your inquiry will receive the prompt attention of an organization that has specialized in phenolics for 32 years.

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PHENOLIC RESINS
MOLDING COMPOUNDS
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PHENOLIC RESINS THAT FIT THE JOB

PNEUMATIC CONVEYORS FOR FOUNDRY SAND

WHIRL·AIR·FLOW

- Foundry sand exactly where you want it . . . as convenient as water from a faucet.
- Instant push-button control of entire system, by one man, from operating panel at sand muller location.
- Pipeline installation requires minimum space, permits expansion or changes in system, is adaptable to efficient plant layout.
- Achieves a new low in operating and maintenance costs.

"OUR PNEUMATIC SAND CONVEYOR HELPS US MEET THE GROWING DEMAND FOR DUCTILE IRON CASTINGS"

Says Mr.
Harold Halverson, pres
BELOIT FOUNDRY CO.
BELOIT, WISCONSIN

The Beloit Foundry Company is a pioneer in the production of ductile iron castings. Their Whirl-Air-Flow pneumatic sand conveyor is doing an excellent job of distributing molding and facing sand to stations throughout the foundry.

Write today!
Our engineers will give you the facts on how the Whirl-Air-Flow System can give you greater output for less cost!

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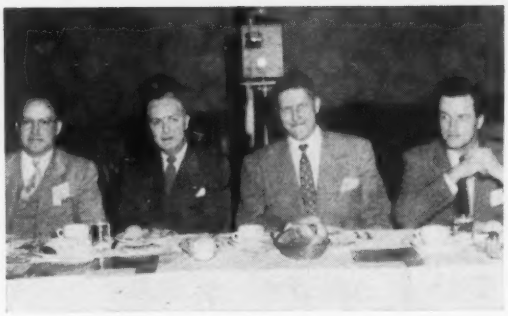


NORTHWESTERN PENNSYLVANIA Chapter of the AFS on Oct. 26 heard Norman A. Birch, American Brake Shoe Co., Meadville, Pa. Left to right are Vice Chairman Bailey Herrington, Hickman, Williams & Co.; Chairman Charles Gottschalk, Cascade Foundry; Mr. Birch; and Robert Jordan, Ajax Iron Works

land Pattern Works, Tennessee Products Corp. coke and ferroalloy plants, United States Pipe & Foundry Co. and the Wheland Co.

The detailed program follows:

Thursday, Feb. 18

9 a.m.—Registration. Chairman, Herman F. Bohr, Robbins & Bohr, Chattanooga.

10 a.m.—**New Trends in Cupola Operation,** Gosta Vennerholm, assistant manager, Manufacturing Research Department, Ford Motor Co., Dearborn, Mich. Chairman, J. E. Reynolds, asssistant to director of quality control, U. S. Pipe & Foundry Co., Bessemer, Ala.

11 a.m.—**Current Trend in Molding Sand Mixtures for Foundry Use,** Clyde Sanders, vice president, American Colloid Co., Chicago. Chairman, Thomas C. Alford, the Wheland Co., Chattanooga.

12:30 p.m.—Luncheon. Presiding, Paul L. Arnold, resident manager, U. S. Pipe & Foundry Co., Chattanooga. Welcome by Honorable P. R. Olgiati, mayor of Chattanooga. Invocation, Dr. James L. Fowle, First Presbyterian Church, Chattanooga. **Your AFS and Its Progress,** Frank J. Dost, president, Sterling Foundry Co., Wellington, O., and vice president, AFS; and William W. Maloney, AFS secretary-treasurer.

2:15 p.m.—**Supervisory Incentives,** C. J. Pruet, chief industrial engineer, McWane Cast Iron Pipe Co., Birmingham. Chairman, N. D. Neptune, metallurgist, National Cast Iron Pipe Co., Tarrant City, Ala.

3:15 p.m.—**Shell Molding and Methods Engineering,** James H. Smith, general manager, Central Foundry Division, General Motors Corp., Saginaw, Mich. Chairman, Walter Coleman, president, Coleman Engineering Co., Chattanooga.

4:15 p.m.—**Developments in Foundry Sand Reclamation,** Clifford E. Wenninger, National Engineering Co., Chicago. Chairman, H. M. Barker, superintendent, U. S. Pipe & Foundry Co., Chattanooga.

5:15 p.m.—**Safety and Hygiene,** W. N. Davis, director of safety, AFS, Chicago. Chairman, W. M. Hamilton, manager, Crane Co., Chattanooga Division, Chattanooga.

Friday, Feb. 19

9 a.m.—Plant visitation. Chairman, Karl Landgrebe, general superintendent, Foundry Division, the Wheland Co., Chattanooga.

1:30 p.m.—**Cobalt 60, a Foundry Tool,** Warren Jeffery, professor, University of Alabama, Tuscaloosa, Ala. **FEF Training Program at the University of Alabama,** E. C. Wright, professor, University of Alabama. Chairman, John Lasater, Combustion Engineering Co., Chattanooga.

3 p.m.—**A Comparison of Present and Proposed Molding Machines,** Glenn W. Merrefield, Giffels & Vallet Inc., Detroit. Chairman, Dave Shannon, vice president, Somerville Iron Works, Chattanooga.

4:30 p.m.—**Gating,** Thomas F. Kiley, Meehanite Metal Corp., New Rochelle, N. Y. Chairman, Paul Stuff, metallurgist, Ross-Meehan Foundries Inc., Chattanooga.

7 p.m.—Annual banquet. Presiding, W. P. Delaney, president, Eureka Foundry Co., Chattanooga. Invocation, Ray F. Dykes, pastor, White Oak Baptist Church, Chattanooga. Toastmaster, Harry Griscom, manager, Foundry Division, the Wheland Co., Chattanooga. **The Industrial Progress of the South,** Honorable Estes Kefauver, senior U. S. senator from Tennessee.

Conveyor Manufacturers Elect Officers

R. F. Tomlinson, manager, conveyor department, Oliver Corp., A. B. Farquhar Division, York, Pa., was elected president of the Conveyor Equipment Manufacturers Association during its 20th annual meeting, at the Greenbrier, White Sulphur Springs, W. Va., Oct. 20. He succeeds Harry C. Davis, general manager, Kanawha Mfg. Co., Charleston, W. Va.

Elected vice president, treasurer and secretary, respectively, were Jervis C. Webb, president, Jervis B. Webb Co., Detroit; E. E. Boberg, sales manager, Standard Conveyor Co., North St. Paul, Minn.; and Russell B. Maas, president, Screw Conveyor Corp., Hammond, Ind.

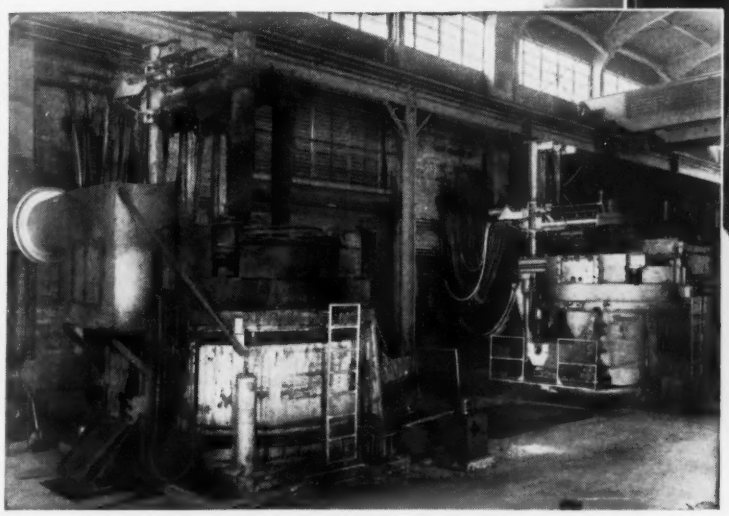
Directors are Mr. Davis; Fred S. Wells, vice president, Stephens-Adamson Mfg. Co., Aurora, Ill.; and D. E. Davidson, vice president for sales, Link-Belt Co., Chicago. R. C. Sollenberger was re-elected executive vice president and will continue as staff head of the association, in its Washington headquarters.

Record attendance included representation of almost 85 per cent of member companies. Sales promotion was the principal discussion topic, aside from routine business and the industry's annual golf tournament.

CENTRAL MICHIGAN Chapter of the AFS held its annual youth encouragement night on Nov. 18, at the Hart Hotel, Battle Creek, Mich. From left to right above are one of the young student guests and Speaker Wally Weber, "Football's Wizard of Words," who is freshman football coach at the University of Michigan

"THE CO-OPERATION WAS TERRIFIC!"

...Ingersoll Products Division
Borg-Warner Corporation,
Chicago



Twin Lectromelt Furnaces at Ingersoll Products Division of the Borg-Warner Corporation.

One of Ingersoll's new 18-ton Lectromelt Furnaces pours its first heat.

Lectromelt people, electrical equipment suppliers and the power company teamed up for fast action . . .

"The first of these two furnaces was installed in the fastest time I've ever seen . . . three weeks from foundation rack until we turned on the power for melting our first charge." These are comments of Neal Ruisard, Ingersoll's Chief Electrical Engineer.

To put in a new furnace or replace an old one and get into production fast, you'll need maximum help from your furnace builder. Lectromelt helps you minimize lost time (lost money) at installation. Every Lectromelt* Furnace is fully assembled on the Lectromelt factory floor. It's right before it's shipped! Then Lectromelt men come to your plant to help get your new furnace into action fast.

Write for Catalog No. 9 giving complete data on Lectromelt Furnaces. Request engineering or service information. Pittsburgh Lectromelt Furnace Corporation, 314 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF.

MOORE RAPID

WHEN YOU MELT... *Lectromelt*

AFS CONVENTION PLANS GAIN MOMENTUM

As Committees Are Named and Exhibit Space Assigned

COMMITTEES have been appointed and the tentative program outlined for the 58th annual American Foundrymen's Society convention and exhibit to be held May 8 to 14 at Public Auditorium in Cleveland. The general convention committee has as its honorary chairman a past national AFS president, Walter L. Seelbach, president, Superior Foundry Inc., Cleveland.

Stephen E. Kelly, Eberhard Mfg. Co., is chairman; David Clark Jr., Forest City Foundries Co., vice chairman; Howard E. Heyl, Federal Foundry Supply Co., secretary, and F. Ray Fleig, Smith Facing & Supply Co., treasurer. Officers of the various additional committees are listed below.

The tentative program of technical sessions has been released by Hans J. Heine, acting AFS technical director, and it is subject to modification and much amplification as the various society divisions complete arrangements with the authors of papers and with discussion leaders who will form the core of international discussions and interchange of experimental data and production experience on the many facets of technical know-how which encompass all branches of the foundry industry.

Foundry equipment manufacturers and suppliers in record numbers have applied for show space in the many exhibit halls of the Auditorium. This response by those who furnish production equipment and materials for the making of castings is assurance that all visitors who have an active interest in continued progress of the foundry industry will see the most advanced machinery, equipment and production techniques.

Reception Committee
Chairman, Howard C. Gollmar, Elyria Foundry Division, Industrial Brownhoist Co., Elyria, O.; *vice chairman,* Walter E. Sicha, Aluminum Co. of America.

Ladies Entertainment Committee
Chairman, Mrs. Stephen E. Kelly; *vice chairman,* Mrs. David Clark Jr.

Banquet Committee
Chairman, Alexander D. Barczak, Superior Foundry Inc.; *vice chairman,* Gilbert J. Nock, Nock Fire Brick Co.

Northeastern Ohio Day Committee
Chairman, John Davenport, Fulton Foundry & Machine Co.; *vice chairman,* R. A. Green, Eastern Clay Products Dept.

Publicity Committee
Chairman, Harold Wheeler, Superior Foundry Inc.; *vice chairman,* Robert H. Herrmann, FOUNDRY.

Plant Visitation Committee
Chairman, Walton L. Woody, National Malleable & Steel Castings Co.; *vice chairmen,* E. M. Knapp, Ferro Machine & Foundry Inc.; A. C. Denison, Fulton Foundry & Machine Co.; *executive secretary,* Emil J. Romans, National Malleable & Steel Castings Co.; *technical adviser,* Lewis T. Crosby, Sterling Wheelbarrow Co.

Shop Course Committee
Chairman, Frank C. Cech, Cleveland Trade School; *vice chairman,* James G. Goldie, Cleveland Trade School.

Tentative Program

Saturday, May 8
9 a.m.—Registration opens
9:30 a.m.—Exhibits open (Northeastern Ohio Day, admission by invitation only)
5 p.m.—Registration closes
5:30 p.m.—Exhibits close

Sunday, May 9
No technical sessions

Monday, May 10
8:30 a.m.—Registration opens
9:30 a.m.—Exhibits open
10 a.m.—Technical Sessions: Light metals, brass and bronze, malleable
Noon—Light Metals Round Table Luncheon
2 p.m.—Technical Sessions: Light metals, brass and bronze, malleable
4 p.m.—Technical Sessions: Light metals, brass and bronze shop course, malleable shop course
5 p.m.—Registration closes
5:30 p.m.—Exhibits close
8 p.m.—Shop Courses: Gray iron, sand

Tuesday, May 11
8:30 a.m.—Registration opens
9:30 a.m.—Exhibits open
10 a.m.—Technical Sessions: Pattern, light metals, brass and bronze, malleable, time study and methods
Noon—Round Table Luncheons: Educational, brass and bronze, malleable
2 p.m.—Technical Sessions: Safety & hygiene, light metals, plant and plant equipment, time study and methods, plaster mold
4 p.m.—Technical Sessions: Safety & hygiene, brass and bronze shop course, malleable shop course, educational, pattern
5 p.m.—Registration closes
5:30 p.m.—Exhibits close
8 p.m.—Shop Courses: Gray iron, sand

Wednesday, May 12
9 a.m.—Registration opens
10 a.m.—Annual business meeting and Charles Edgar Hoyt Annual Lecture
Noon—Exhibits open
Noon—Round Table Luncheons: Gray iron, pattern, safety & hygiene
2 p.m.—Technical Sessions: Sand, heat transfer, refractories
4 p.m.—Technical Sessions: Gray iron, sand, safety & hygiene, heat transfer
5 p.m.—Registration closes
5:30 p.m.—Exhibits close
7 p.m.—Annual Banquet

Thursday, May 13
8:30 a.m.—Registration opens
9:30 a.m.—Exhibits open
10 a.m.—Technical Sessions: Steel, gray iron, sand
Noon—Steel Round Table Luncheon
2 p.m.—Technical Sessions: Gray iron, sand refractories, cost
4 p.m.—Technical Sessions: Steel, gray iron, sand
5 p.m.—Registration closes
5:30 p.m.—Exhibits close
8 p.m.—Shop Courses: Gray iron, sand

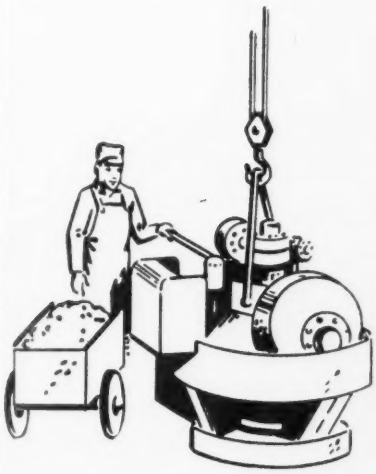
Friday, May 14
8:30 a.m.—Registration opens
9:30 a.m.—Exhibits open
10 a.m.—Technical Sessions: Steel, gray iron, sand
Noon—Registration closes
1 p.m.—Exhibits close

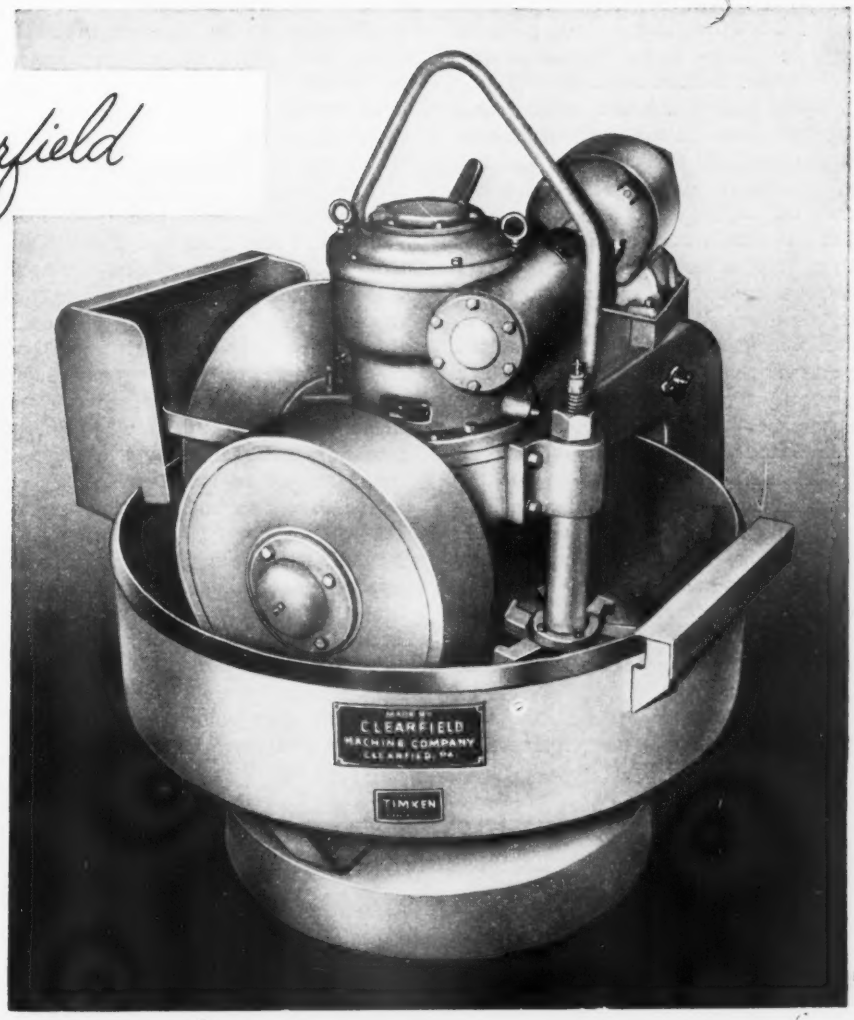
AFS HEADQUARTERS: Architect's sketch of the new building being erected by the American Foundrymen's Society in the Chicago suburb of Des Plaines, Ill., to serve as headquarters for the national office. As reported here last month, brief ground-breaking ceremonies were held at the site on Nov. 17

for *Portability*

THE *Clearfield*

No. 414





This 414 Clearfield Mixer has a wide field of use in either large or small plants in which the plan of sand preparation is built around the portability of the mixing unit. It may be suspended from a crane or monorail hoist and may be thus carried over the entire molding floor eliminating the need for conveying equipment. The machine is perfectly balanced and may be loaded, operated and discharged while suspended above the floor. Where crane facilities are not available for this purpose, the mixer may be equipped with roller bearing casters by means of which it may be moved anywhere over a level floor. The 414 delivers four cubic feet per batch.

CLEARFIELD
MACHINE COMPANY
CLEARFIELD
PENNSYLVANIA, U. S. A

Adventures of Bill

By PAT DWYER

Illustration by RICHEY

AMONG the many toys, gadgets and gifts—useless and otherwise—that floated down through the chimney and in through more plausible if less conventional entrances Christmas Eve and night, a box full of miniature structural steel parts that fell to the lot of the one grandson has retained its attraction longer than any other.

Occasionally, and as a special favor, the budding engineer allows me to stand by and hand him some of the parts he requires in the erection of a skyscraper, a train shed or a gantry crane. He is graciously pleased to admit that sometimes I display almost human intelligence in picking out the correct pieces, but as a general rule I am given to understand that my efforts in this direction are more of a liability than an asset. In fact, he has claimed that the work goes along faster when he is alone, or has the table or floor to himself.

He has a dear little sister, who on many occasions has expressed a keen desire to be allowed to assist him. For some mysterious reason he refuses absolutely to let her come near the scene of operation on the table or on that part of the floor where he is engaged for the time in converting a dream into a reality. He protests bitterly and in a loud voice that she does not know anything about machinery and that she will mix the parts in hopeless confusion if she is allowed to touch them. In a deep and dark undertone meant solely for the young lady's ear he threatens to smash every one of her dear little fingers with a hammer if she dares to lay even one of them on any of his stuff.

Sometimes in my position of unbiased observer I am inclined to rebuke the young savage for his apparent selfishness. I recite for him the cute little story about the little birds who agree so amicably in their little nest. I wonder why this young hammer man does not treat his dear younger sister with a greater and more becoming measure of courtesy and loving kindness.

After the battlers had retired the other night I directed their lady mother's attention to the subject and asked her if she had any theory to account for it. She said she did not need any theory. The whole situation was a natural result of the different dispositions of the two children. The boy is careful and conscientious, never breaks anything. He puts everything away carefully when he is through playing. I was told quite plainly that the composite virtues of thriftiness, order and neatness were a natural heritage from the female side of the family tree. She did not like to say where the other young limb came by her wild ways and destructive nature.

"However," she said, "dear papa, you must remember the children only have two parents—one, the present speaker, the daughter of a gracious Scottish lady, the other a lineal descendant of a pike-carrying fenian out with Shawn O'Farrel at the rising of the moon. And furthermore, and in addition thereto, on more than one occasion when I was a charming young colleen I have heard the present children's only surviving gran'pa reciting The Fighting Race with appropriate gestures. Any more questions?"

The boy has toys packed away in a drawer, toys he received several years ago. They are in as good condition now as they were the night old Santa Claus dropped them down the chimney. The swashbuckling young heroine in a scanty and torn smock and bloomers has nothing.

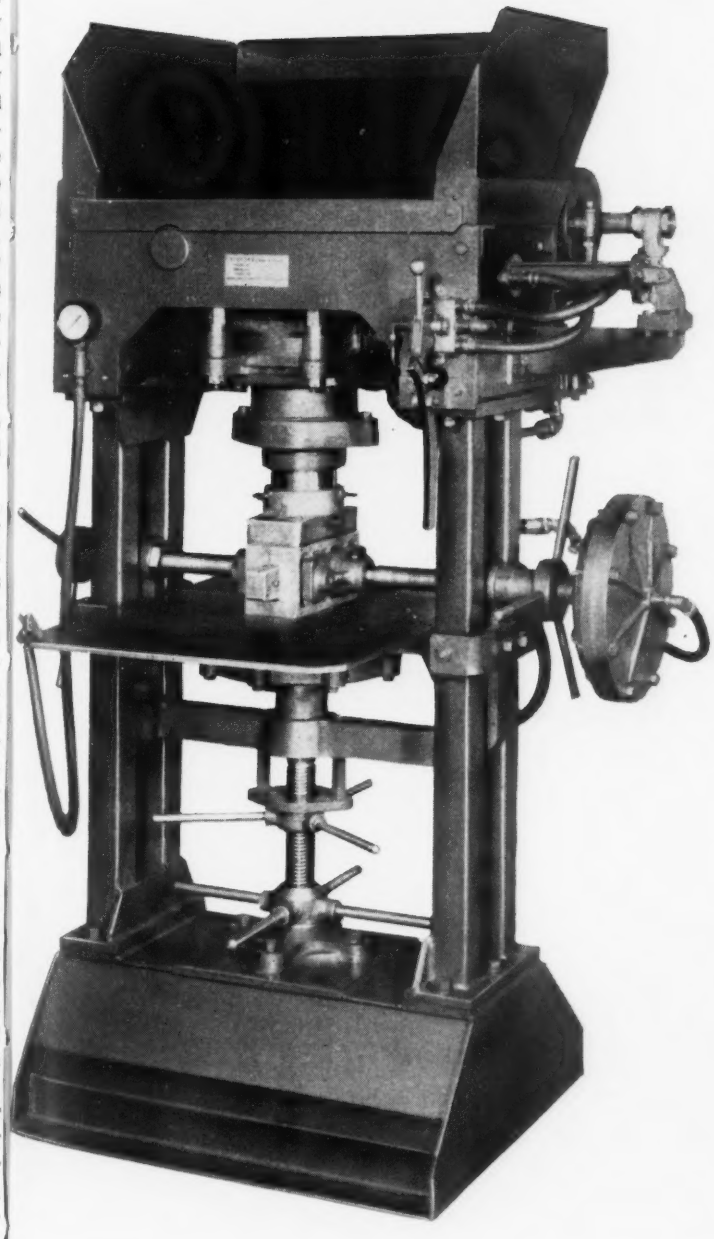
Three days after Christmas her picture books look like something that had been dug out from under the snow at the fag end of a hard tough winter. Every one of her dolls has a leg or an arm or an eye missing. Some of them are minus right and left members. The hair has disappeared from the head of a particularly big bulgy doll. The entire top of the skull has been smashed in on a doll with wobbly eyes.

I don't know if this doll's condition is due to a desire on the owner's part to see what made the eyes move, or merely to the fact that the doll

(*Continued on page* 199

Origin of the famous saying "One of these days, O-N-E of these days!"

Redford NO. 4 CORE BLOWER



Designed to add more power, capacity and speed to traditional Redford simplicity, flexibility and convenience, the No. 4 Redford superbly fills the need for a truly fast and flexible machine to blow cores from a few ounces to 10 lbs.

There is no need for the operator to wait for the machine at any time—the fast operating cycle permits immediate release of the core box after the cores have been blown.

Exhaust air is utilized to thoroughly fluff the sand remaining in the sand magazine after each blow, thus reducing the possibility of cratering.

Magazine heads normally furnished with the No. 2 Redford machine can be used with the No. 4 Redford. Larger new type magazine heads are also available as standard equipment.

A completely new fully adjustable clamp for vertically parted core boxes simplifies core box set up—when not needed the clamp units can be adjusted all the way out or completely taken off the machine.

Redford No. 4 users report production up to 8 boxes per minute using only one core box per machine. To get complete information write for Specification Bulletin 4.

Cores at right illustrate wide range of work that can be done with the Redford No. 4 Core Blower.

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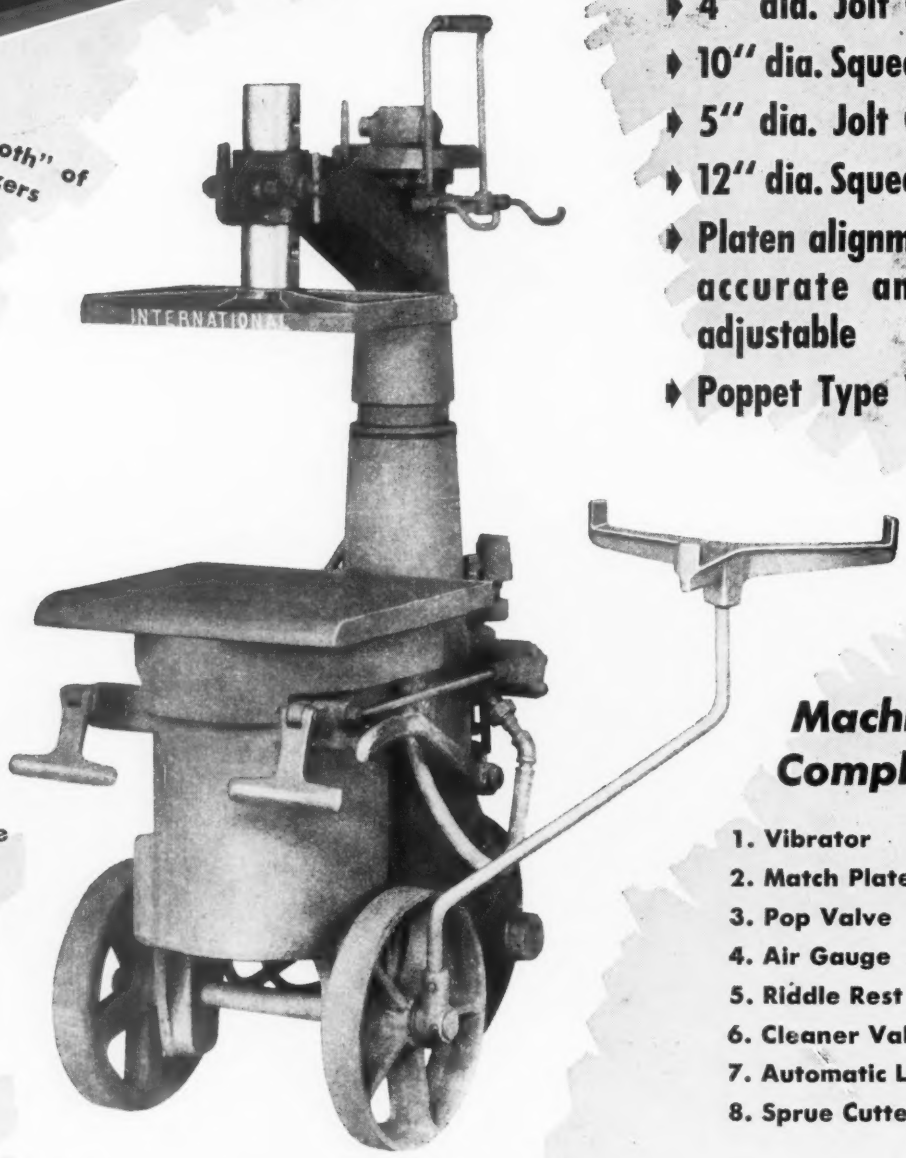
The "Behemoth" of Jolt Squeezers



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3. Pop Valve
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5. Riddle Rest
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8. Sprue Cutter Holder

Long-lasting because of Sturdy Construction - extra heavy weight

INTERNATIONAL MOLDING MACHINE CO.

LA GRANGE PARK, ILLINOIS • (Suburb of Chicago)

(*Continued from page* 196)

served as a club, a weapon of defense and offense in certain slight bickerings that always seem to occur when the owner happens to be among those present. So far as I know the idea of substituting a doll for a flat iron in cracking walnuts is original with this practical minded young lady.

The only doll that has survived in half presentable condition up to the present is one made from extra strong cloth and packed with sawdust. Even this tough little specimen has been distorted out of shape and flattened to an alarming extent. The nicely rounded painted face originally wore what passes among us common people as an angelic expression. My own private opinion of that type of face is that the owner is a silly, although probably harmless, female nut. However, opinions differ and I am willing to concede my fellow citizens the right to admire as many of the movie queens as they please. What I was going to say was that the face with the wide-open eyes and cupid bow mouth now shows the effect of a hard and a fast life. Rough, that's the word. It looks as if the owner had gone three or four fast rounds with a steam hammer and then had been dragged out by the heels and thrown into the alley back of the vinegar works.

These may seem hard words, mates, but I believe in sticking to the truth under any and all circumstances. Of course, occasions arise when one may equivocate to some slight extent in pursuit of a worthy purpose. This is not one of them—Oh, well, let it go. Let it go.

One eye has been obliterated. That part of the face containing the other eye has been pushed so far to one side that the eye appears to be leering around a corner. The stuffing in the torso and in the unwieldy limbs has been shifted in a manner to violate all the rules and laws of human anatomy. In the original state one would be toying perilously with the truth to claim that the thing was a miniature reproduction of the human figure. In its present condition it resembles nothing so much as an old chew of tobacco magnified approximately 15 diameters.

I might tip Santa Claus off next Christmas to bring a nice cast iron doll or one made of boiler plate stuffed with buck shot, only I am afraid the dear little angel instantly would see the possibility of crippling various members of the family by carefully dropping it accidentally on their toes. A doll is a doll and I really must draw the line when it is used as a substitute for a hammer or a projectile in smashing windows. A broken window may be tolerated in summer. It saves one the trouble of lifting the sash to admit the clean, pure air. This condition or necessity does not obtain in winter.

Some time in the future when I have the necessary leisure I intend to look more deeply into the fundamental difference between summer and winter air. My interest is purely academic. I can live quite comfortably in a house where the windows never are opened. However, I know many worthy people who are convinced firmly that existence is not possible in summer unless the windows are opened. How they keep the flame of life burning in winter with the windows closed is somewhat of a mystery which, as I said, I shall try to solve at the first favorable opportunity.

What with one thing and another I have no idea when that opportunity will present itself. One job follows another with monotonous and disconcerting regularity, even if they do not follow in logical sequence. For example, I had no intention of writ-

(*Concluded on page* 202)

Here's
HIGH PRODUCTION, MODERN GRINDING
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Two men to a machine, workers at Neenah Foundry Co. clean castings on a battery of eight Standard Type-7HM Snagging Grinders with 20-inch wheels. Overhanging base and well spaced wheels provide extra accessibility and ample working room for high-speed production.

Available from 3 hp to 10 hp for 14-inch to 20-inch vitrified or resinoid bond wheels. These units have interlocking arrangement to prevent overspeeding.

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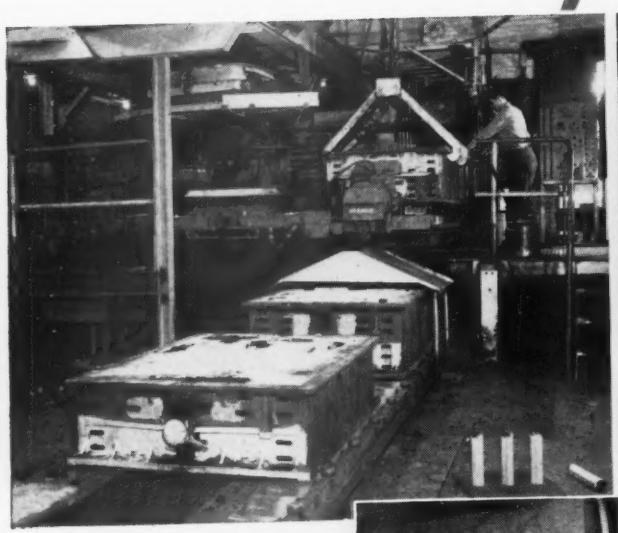

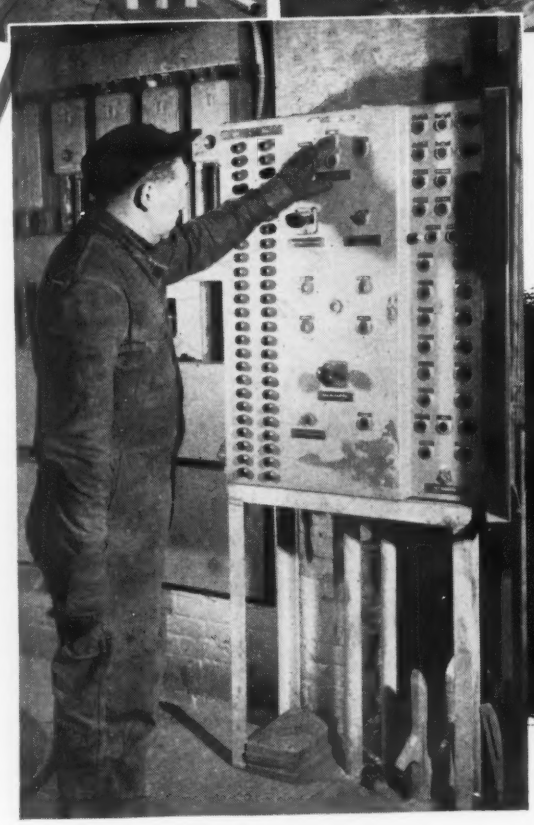

High speed o
wit

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Here is the revolutionary, pushbutton, automatic indexing molding machine, which is our answer to your needs for fast, uniform production.

In the accompanying illustration, the machine is being used for producing couplers and other railroad car castings. However, the flasks used are adaptable to a wide variety of other types and sizes.

On one representative installation this indexing machine is turning out a cope or drag at an extremely fast rate of production.

The unit is controlled by a central panel board, and the automatic cycle can be interrupted any time.

This Herman development may fit your requirements for automatic control of your foundry operations. We will welcome an opportunity to discuss it in detail.

We make a type and size molding machine for every foundry operation.

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Further information on this Herman Indexing Machine installation is available in reprint form.

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Herman **MOLDING MACHINES**

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

(*Concluded from page* 199)

ing about dolls when I sat down to dash off a few well chosen words. The dolls seemed to ooze in after the fashion in which they creep under people's feet in every room in the house. For inanimate objects they have the most amazing faculty for traveling around and bobbing up in the most unexpected places.

If I go to roost in an easy chair without first taking the precaution to examine it sharply I am as apt as not to find myself sitting on half a dozen assorted sizes of dolls in various stages of dissolution. The impression momentarily is extremely embarrassing. Usually it reminds me of an early experience when inadvertently I sat on a clutch of turkey eggs carelessly left by a caller on a low chair.

Bill drifted in the other night to sit by the fire, to smoke the pipe of peace and discuss some of the burning issues of the day. Among other items of more or less importance I touched briefly on the subject of dolls with particular reference to one incident which almost caused me to pass out of the picture through a sudden attack of heart failure.

"You are not the only one," Bill said, "whose heart does a flip flop. Drawing on now toward the close of the year, the period when annual statements in all their naked simplicity condemn or confirm the policy of the preceding 12 months, the foundryman is inclined to one of two courses. Either he will retire into his shell and view conditions through a jaundiced eye, or he will pat himself comfortably on the back, depending on whether the figures in the statement are written in red or black ink.

"Whether he has gained or lost money during the year, the closing days are apt to find him in a reflective mood. How should he improve conditions if the year has been unsatisfactory? How can he maintain existing conditions in event the flowing tide now setting free and full toward the port of his desire should swing into a cross current or, turning on the ebb, threaten to carry him into dangerous waters?

"A few years after World War I, with the dove of peace settled temporarily back on her nest, and with the former snarling nations exchanging polite smiles and hand clasps in public, and darkly muttering 'One of These Days, O-N-E of These Days!' in private, a great commotion was raised by one political party in England because a certain shipbuilding contract went to Germany. The claim was made that with the facilities, position, financial standing and prestige of the greatest ship building nation in Europe, and therefore in the world, it was a positive shame and disgrace to let the job go to any competitor.

" 'Cut the profits' cried the disgruntled politicians and the alert political press. 'Cut the profits on this one job. You have made enough on wartime contracts. Take the thing at cost for the honor and glory of the empire and the relief of thousands of patriotic but at present idle and hungry honest British artisans.'

"With characteristic British conservatism the shipyard owners issued a brief and dignified statement to the effect they had taken all these factors into consideration, and had submitted figures which included no profit. As usual, the public and especially the loyal opposition placed no credence in this statement, particularly when they learned that the German yard had taken the contract for approximately 30 per cent less than the lowest figure submitted by any British competitor.

"Before the job was finished the German yard blew up with a loud financial bang, another sacrifice on the altar of ignorance and good intention. The first law of economics is that to realize a profit, the income must exceed the outlay. The second law is, or should be, whenever a competitor offers to take a job below cost, let him have it.

"Touching on the problem of dolls and children you might do worse than follow the example of the Irish people. When it rains over in the little green isle, the people let it rain. Good night!"

Universal Jig Holds Parts for Radiography

By E. R. FOOR
Metallurgist
Solar Aircraft Co.
Des Moines, Iowa

A UNIVERSAL jig for holding small, irregularly shaped parts for industrial x-ray inspection is said to eliminate setting-up operations in production line radiographic work. The holding device consists of a thin-walled rubber bag filled with fine plastic granules. Attached to the bag is a flexible hose through which air can be evacuated by a portable electric vacuum pump.

Holding device consists of a thin-walled rubber bag of plastic granules and a vacuum pump. Here half the bag (2) is holding a part for x-raying. Film is indicated at 1

In its natural state, the bag is very limp. When some of the air is removed it becomes as pliable as putty, and can be molded against the part to be radiographed. The film in its flexible holder is inserted between the bag and the part. Upon further evacuation of air the bag and its contents become as hard as rock, keeping the molded shape and holding the part and film in place for the exposure. The part can be removed from the hardened bag and another, like part placed on it. The bag relaxes only when air again is allowed to enter the bag.

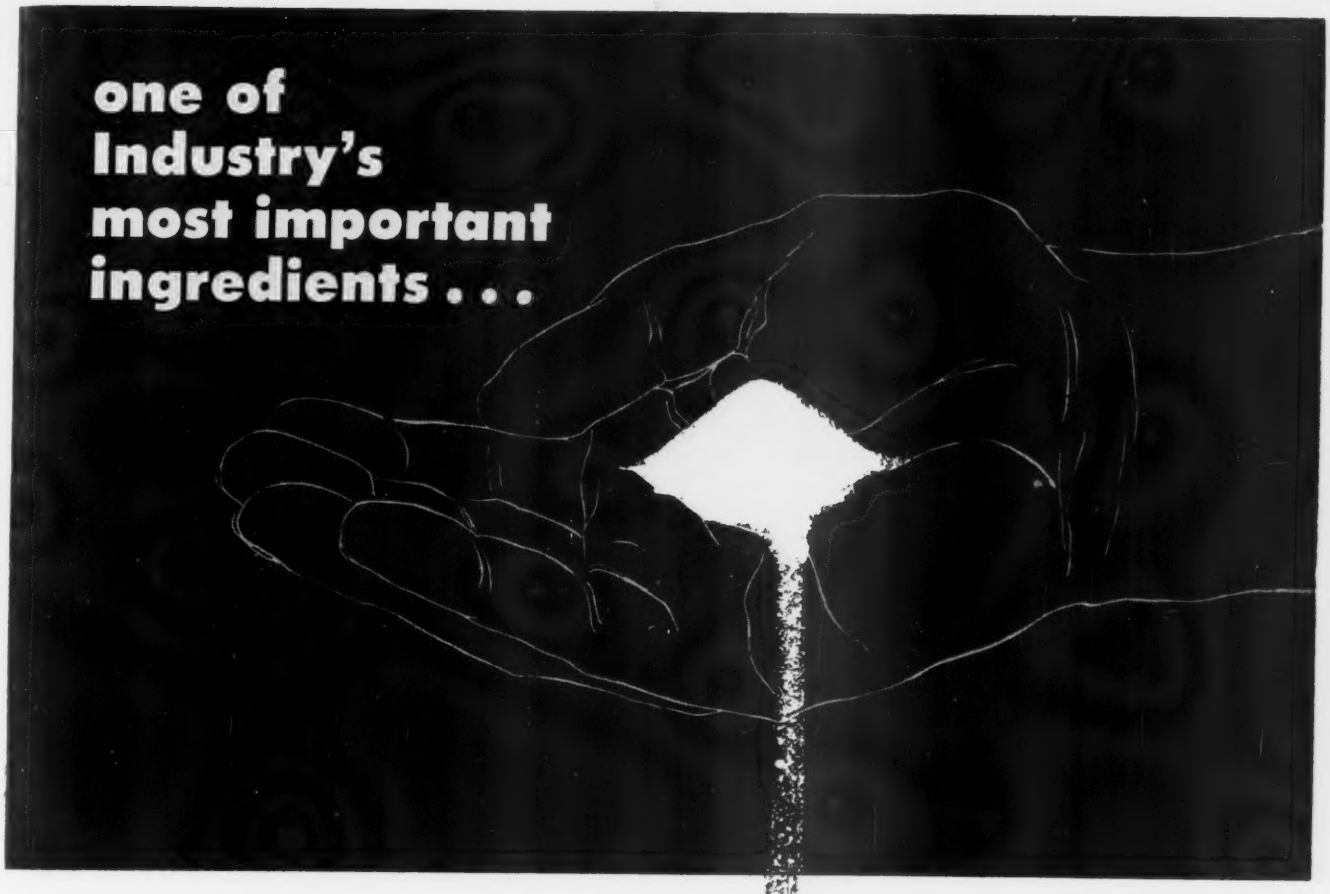
Radiography can be performed through the bag with no trouble, since the bag and its plastic contents are transparent to x-rays. Originally intended only for medical x-ray applications, the device was developed and is distributed by Picker X-ray Corp., White Plains, N. Y. Experimental work for industrial application of the equipment was done at Solar Aircraft Co., Des Moines, Iowa.

Holds 25-Year Dinner

J. O. Ross Engineering Corp., New York, held its annual dinner for members of its 25-Year Club and their wives on Nov. 19, at the Westbury Hotel, New York. Five new members were added to the club's roster, making a total of 32 employees who have been with the company for 25 years or more.

As is its custom, the firm presented each new member with a gold wristwatch to commemorate the occasion.

one of Industry's most important ingredients . . .



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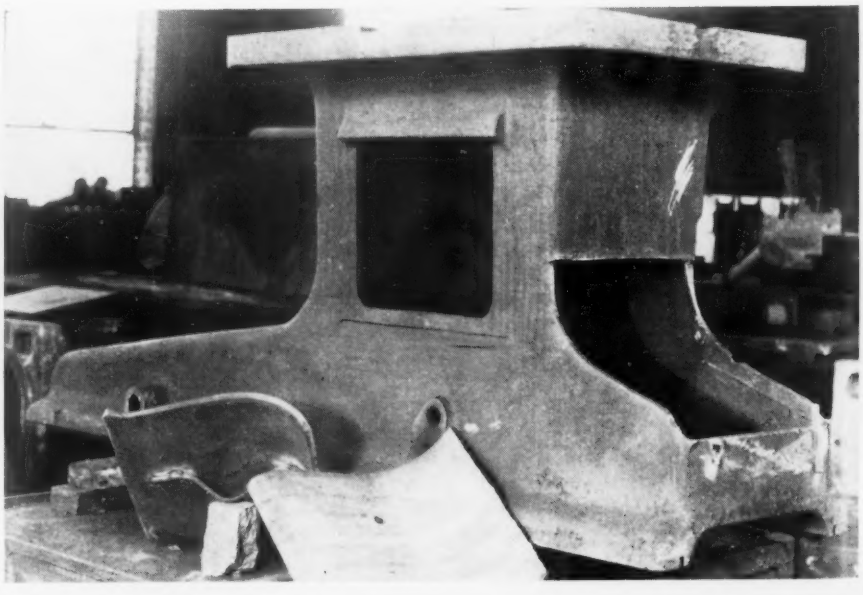
Foundry Repair Welding

By C. T. WILLIAMSEN, Eutectic Welding Alloys Corp., Flushing, N. Y.

Defective spots in the casting have been removed and cast iron patches, cut to size, are ready for insertion

Welding rod is attached to patch to help in positioning. After tacking, rod is removed by light hammer blow

Vee groove around tacked-in patches will be filled with metal by using skip welding to avoid heat build-up



A thin-walled section in this machine tool base was taken out with a chamfering electrode and a piece of uniform thickness welded into place

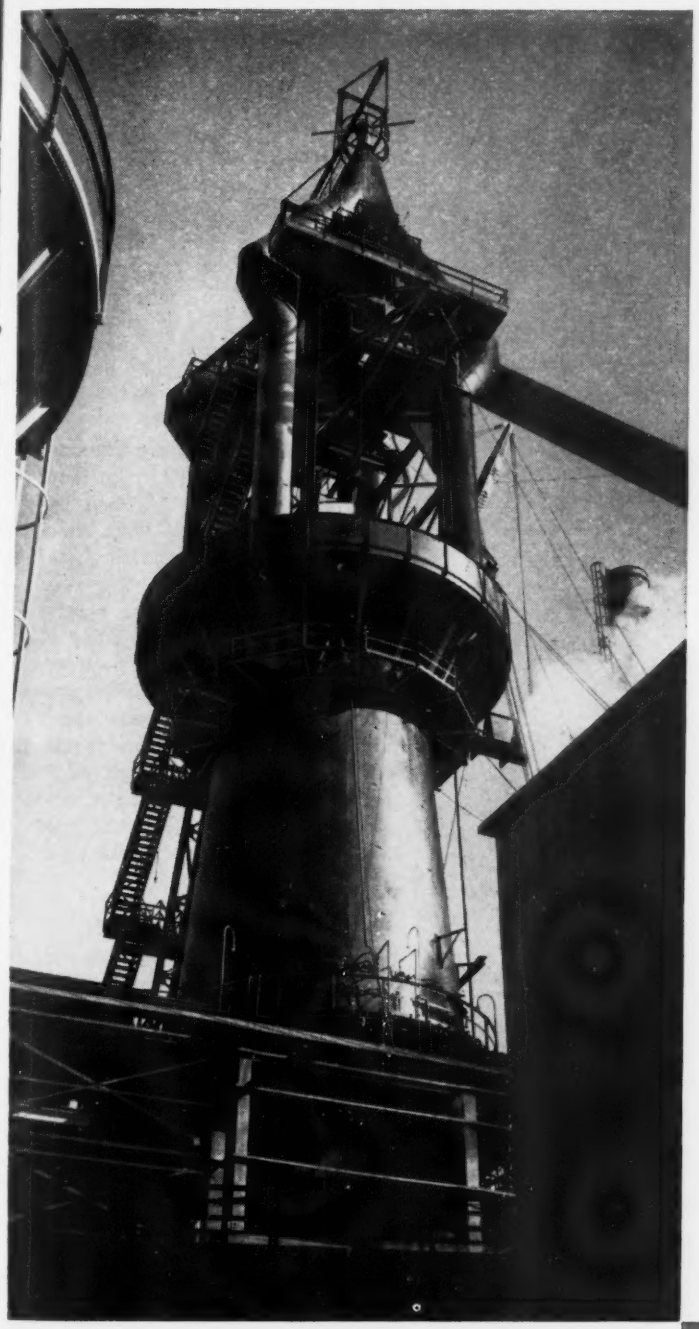
THROUGH the use of new methods and materials in the field of welding, many castings heretofore headed for the scrap heap because of some defect can be salvaged at a substantial saving. One foundry is using cast iron patches to salvage castings that ordinarily would be scrapped. On many occasions a weak or defective section will cause rejection of an otherwise good casting. If this section can be removed and a sound piece of metal inserted, the cost of a new casting will be saved.

Such repair jobs now are simplified with ChamferTrode DC and CutTrode AC-DC, products of Eutectic Welding Alloys Corp. These are chamfering and cutting electrodes which remove unwanted metal quickly. They both operate in a similar manner but one is used for veeing, removing old welds, chamfering and grooving operations and the other for cutting through any type of metal.

The chamfering electrode consists of a core wire coated with a compound formulated to supplement action of the arc. In operation, the core is reduced more quickly than the coating and a tube is formed through which the entire energy is concentrated and projected. When the arc is struck the electrode is held horizontally to the surface and pushed along the line the groove is to take. All metal in its path is blasted away and a groove is formed a little larger than the electrode diameter. Because of the speed of the operation there is little residual heat in the parent metal and, consequently, no heat-affected zone.

For patching work the defective area is removed by cutting or veeing around it and removing it. If the latter technique is used, no further preparatory work need be done as the edges are cleaned by the searing blast and veed ready for welding. A patch then is made to fit the cut-out section, inserted and tack-welded into position. Skip welding technique is used to weld the patch; each pass is made as far distant from the previous deposit as possible to prevent local build-up of heat which might cause stresses. At no time does the casting temperature rise above a comfortable hand heat. Beads are peened to remove residual stresses and wire-brushed to remove slag. The deposits are machinable and a good color match for gray iron.

In replacing a thin-walled section caused by a core shift in a machine tool base, the undersized section is removed with the chamfering electrode. A replacement section is cast to the desired uniform thickness and tack-welded into position. Here again the skip welding technique is used to minimize danger of distortion and embrittlement as the section is welded into place. A casting, repaired in this manner in one foundry, passed inspection without difficulty after machining.



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TOWMOTOR
THE ONE-MAN-GANG

FORK LIFT TRUCKS and TRACTORS

Since 1919

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Magnet Foundry

(*Continued from page* 91)

usually are cylindrical or rectangular in shape.

Directionalizing is accomplished by cooling the castings in a magnetic field in such a manner that the domains in the metal are aligned in one direction to give optimum magnetic properties. Alignment is facilitated when the metal is hot, and, upon cooling, the domains are "frozen" in position, thus assuring retention of the characteristics for best magnetic strength.

Ring-shaped castings are placed on a quartz rod and heated in an induction furnace to 1742° F. Then they are placed on an angle iron trough encircled with directionalizing coils to magnetize the castings. The series of coils is 9 ft long and the castings are pushed through the coils by the operator as he places each succeeding rod in the trough. Each group of castings is in the coils for 20 minutes and is partially magnetized when it leaves. The trough at the discharge end is constructed of brass to facilitate removal of the magnetized castings which would be attracted to the angle iron.

Given Aging Treatment

After directionalizing the castings are loaded into circular metal baskets 24 in. in diam and 5 in. deep resting on a roller conveyor. Loaded baskets are lifted by electric hoist from the conveyor and stacked six deep in 25-in. diam by 36-in.-high steel drums, which in turn are lowered by electric hoist into electrically-heated, air-draw pit type aging furnaces. Four of these furnaces are of 700-lb capacity and two of 300-lb. The castings are brought to 1112° F in ½-hr and held at that temperature for 5 to 10 hr, depending on size.

Boat loads of castings are heat treated in any of seven electrically-heated box type furnaces or two electrically-heated horizontal floor furnaces. Two of the box type furnaces have a single door and hearth plates about 12 in. wide by 36 in. long. The other five furnaces have doors at each end and hearth plates 18 in. wide and 72 in. long. Three of the larger furnaces are designed to operate with a hydrogen atmosphere to protect the molybdenum heating elements, and a temperature of 2462° F may be obtained. Hydrogen atmosphere in these furnaces is at 3 to 4 lb pressure, and there is a flame curtain at the discharge end to prevent an explosion when the discharge door is opened.

(*Continued on page* 208)

MAY-FRAN HINGED-STEEL BELT IS DESIGNED TO HANDLE HOT, HEAVY AND ABRASIVE CASTINGS

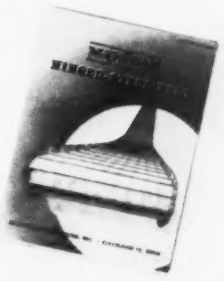
Only the most rugged belt could take the punishment MAY-FRAN Hinged-Steel Belting will take day and day out. Its unique design and sturdy construction enable it to handle hot, heavy and abrasive castings that quickly disintegrate ordinary belting.

MAY-FRAN Belting is assembled from heavy gauge hinged-steel links by high-carbon steel rods. Side chains become an integral part of the belt, and outside links incorporate interlocking wings which remain positively engaged at all times.

Even when belt travels from one level to another or over conveyor sprockets, wings will never separate.

MAY-FRAN Hinged-Steel Belting can be furnished to your specifications in widths from 6 inches to 6 feet and in any length or carrying capacity. Either solid or perforated links are available in 2½, 4, 6, 9 and 12-inch pitch lengths.

For maximum service with minimum upkeep, specify MAY-FRAN Hinged-Steel Belting!



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If you don't see it here . . . . ask for it!

We manufacture a complete line of all types and sizes of Foundry Chaplets, and all kinds of wire and metal formations for your foundry use. If we don't already make what YOU need, we'll design and develop just the CHAPLET to suit your requirements. Your inquiries and specifications are invited . . . . for quick service, write for working samples. As a few of our specialties:

- **RADIATOR CHAPLETS**
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- **BOILER CHAPLETS**
- **DOUBLE HEAD CHAPLETS**
- **MOTOR CHAPLETS**
  (Regular or Extended stems)
- **TIN TUBES**
  (Plain or Perforated)
- **FOUNDRY NAILS**
  (Plain, Nicked or Barbed)
- **SKIM GATES**
- **CORE WIRES**
- **CORE PLATES and SHIMS**
- **TAPER DRIVE PLUGS**

CRESCENT FUSETITE CHAPLETS ARE MADE ACCURATE OF PROPER ANALYSIS MATERIALS FOR THE FUSING-IN PROCESS.

Being the Originators and Manufacturers of Radiator, Shoulder, Double Head and Motor Chaplets, Your Foundry benefits by our Chaplet Manufacturing experience since 1889 for the leading Stove, Radiator, Boiler and Motor Foundries.

We carry thousands of different types and sizes in stock for quick delivery, and have the facilities to make up special sizes promptly.

WRITE FOR SAMPLES AND PRICE LIST.

Crescent Brass & Pin Company

5766 TRUMBULL AVE.

DETROIT 8. MICHIGAN

(*Continued from page* 206)

The other box furnaces have Nichrome heating units and are limited to operation at 1742° F. Metal rods are used for pushing the boats through the double door furnaces and for pushing them in and pulling them out of the single door units. Each of the furnaces has a capacity of 120 lb of magnet castings per hour.

The horizontal furnace has a roller hearth and is designed to operate in an air atmosphere at maximum temperature of 2012° F. Heating chamber is 21 ft, 6 in. long and door openings at each end are 5 in. high by 24 in. wide. Five regular heat treating boats are set on a bar type pallet 18 in. wide by 30 in. long and the pallet placed on electrically turned rolls at the front of the furnace. When pallet space is available in the furnace, an electric motor automatically opens the entry door and the rolls turn quickly, running the loaded pallet into the furnace; the door closes automatically.

Doors Open Automatically

Pallets are in the furnace 45 minutes, moving slowly through the chamber on rollers until the pallet near the discharge end interrupts a photoelectric beam to open the discharge door and cause the discharge rollers to turn quickly, carrying the pallet of finished castings out of the furnace to a roller conveyor section along which are located five directionalizing coils. The discharge door closes automatically while the operators are pushing the boats into the magnetizing coils. For this operation the men wear asbestos mittens and push the boats by hand from the pallet into the coils. The empty pallet then is placed on a roller conveyor along one side of the furnace and pushed by each succeeding pallet to the front of the furnace ready to receive another load of boats.

A pallet of castings is discharged from the furnace every 9 minutes, and the boats of castings remain in the magnetizing coils for 9 minutes. Upon completion of the directionalizing treatment, the boats are removed and the castings dumped into the metal baskets previously described ready for aging in the pit furnaces. The aluminum oxide used for packing is deposited in tote boxes which later will be hauled away by fork truck to the packing area for reuse.

Boats of castings heated in the box type furnaces are placed in directionalizing coils for 10 to 20 minutes. Castings magnetized in these coils and the ones at the horizontal furnace are cylindrical or rectangular

(*Continued on page* 210)

"Let me tell you something!"

"Don't neglect cleaning costs! Get yourself a good, long-lasting shot and you'll save money!"

Here's a tip from an old timer in the foundry business, who knows from experience the importance of *quality* in shot used for cleaning castings.

That's exactly the kind of product METAL BLAST turns out, in ANNEALSHOT and SUPER-ANNEALSHOT. Raw materials going into the melt for these fine abrasives are carefully selected. Forming and heat treating equipment is modern and efficient. Production operations are rigidly controlled. So, METAL BLAST is confident it is offering the very finest shot in the market.

If this fits your thinking, call in your METAL BLAST representative or write direct to **METAL BLAST, Inc.,** 872 East 67th St., Cleveland 3, Ohio.

METAL BLAST ANNEALSHOT
chilled shot and grit

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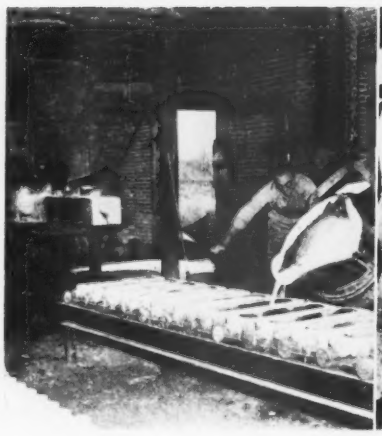
malleable shot and grit

EXPERIMENTAL CUPOLA
Helps Maintain High Quality of
FOUNDRY COKE



Pouring a test heat from the experimental cupola.

Taking pyrometer reading at experimental cupola.

ABC is the only commercial coke plant in the entire nation that employs a production size cupola to test the regular production of its foundry coke.

Equipment of the cupola is all of standard make and latest design. It is lined to 27" inside diameter and equipped with modern blast controls. Up-to-date apparatus for sulphur and carbon determinations is included in the laboratory equipment. By testing regular production of foundry coke, ABC maintains accurate control of the carbon pickup tendency of its product at all times.

ABC's experimental cupola is only a part of its unsurpassed research program which has helped make ABC foundry coke first choice of discriminating melters in more than 30 States.

Your inquiries are invited.

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General Sales Office: First National Building, Birmingham, Ala.

Sales Agents:

GREAT LAKES FOUNDRY SAND COMPANY, Detroit; ST. LOUIS COKE & FOUNDRY SUPPLY COMPANY, St. Louis; THE RANSON AND ORR COMPANY, Cincinnati; KERCHNER, MARSHALL AND COMPANY, Pittsburgh; BALFOUR, GUTHRIE & COMPANY, LTD., San Francisco; ATWILL COKE AND COAL COMPANY, Chicago.

(Continued from page 208)

shaped and lend themselves to treatment in a straight directionalizing field. Horseshoe-shaped castings require special treatment and are directionalized in coils on a panel between the box and horizontal furnaces. Following directionalizing, all castings are loaded into the metal aging baskets.

After aging, the baskets of castings are removed from the pit furnaces by electric hoist and placed on roller conveyors to air-cool. To simplify handling in the finish grinding section the castings are demagnetized in any of four demagnetizing machines located along the conveyor. Demagnetization is accomplished simply by passing the castings through an electrical field created by two coils. Machines here use bucket wheels or small conveyor belts to carry castings through the field and deposit them in tote boxes.

Cleaned by Blasting

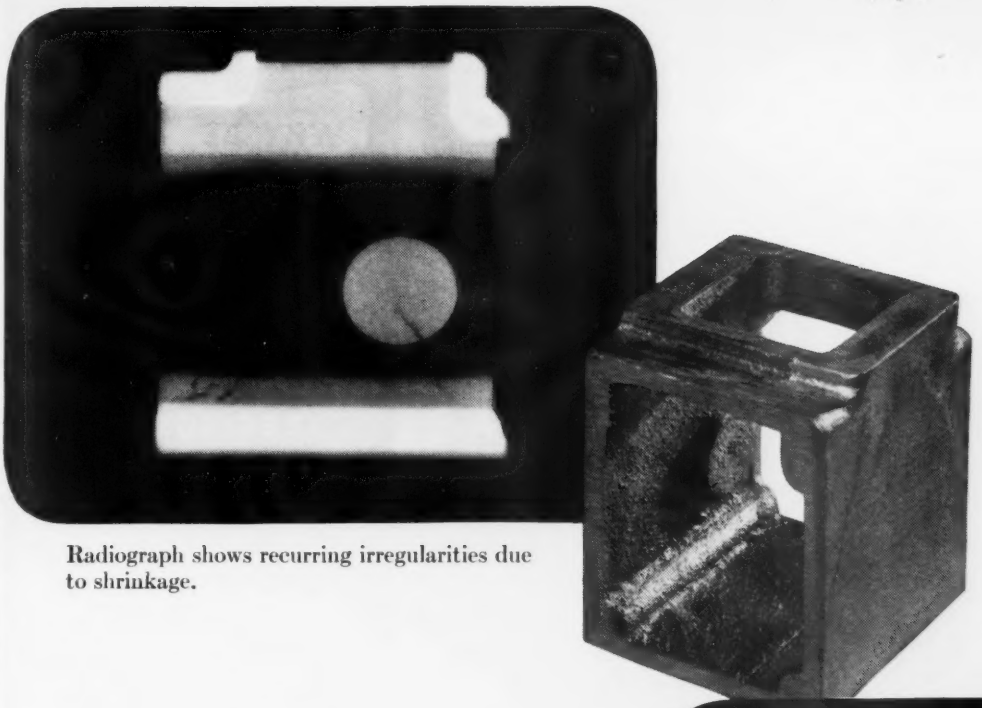
Because the castings are slightly scaled and oxidized from the heat treatment, they are sand-blasted in any of three tumble blast units or a sand-blast cabinet stationed in the heat treat area. Cleaned, demagnetized castings are loaded into tote boxes and rolled to "B" stock, an area set aside for accumulating partly completed magnets prior to final processing. The loaded tote boxes are stored on racks.

The storage area contains equipment for magnetizing, testing magnetic strength and then demagnetizing. Low-strength magnets are returned to the heat treating department for additional treatment.

Final processing consists of grinding, cleaning, visual and gage inspection and testing for magnetic strength. Eight surface grinders employ a movable table on which the work is carried. The table is moved back and forth under a rotating grinding wheel and the castings ground on the peripheral edge of the wheel. Six centerless grinders are used to grind only cylindrically shaped castings. The work is fed between two counter-rotating wheels revolving in the same plane and spaced some distance apart. As the work moves between the two wheels it is ground on the periphery until it fits exactly the space between the wheels.

In the ten double-spindle disk grinders, the work is held rigidly in a movable or rotating fixture. The two grinding wheels rotate in opposite directions about the same axis. The fixture carries the work between the two wheels so that it is ground on

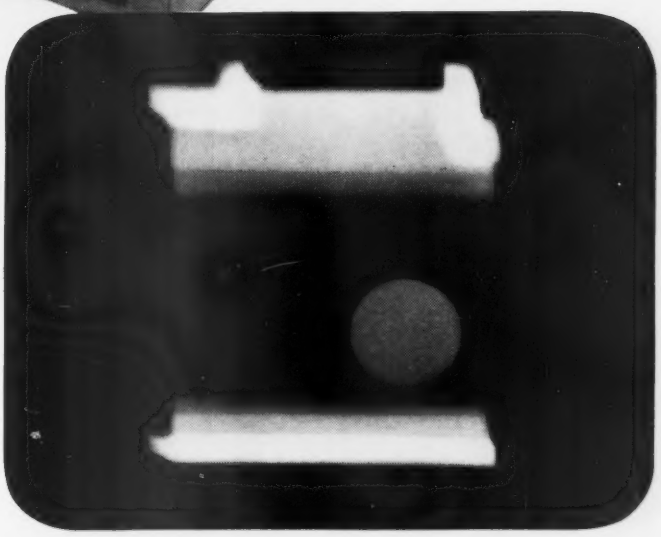
(Concluded on page 212)



Radiograph shows recurring irregularities due to shrinkage.

RADIOGRAPHY

puts the finger on a profit thief



A change in gating produced sound castings.

Shrink was a problem in casting this instrument housing of 355 aluminum. It looked like the yield would run low.

But radiographs of pilot runs put the finger on the cause—revealed a pattern of recurring irregularities. This suggested a change in gating which, when adopted, quickly corrected the difficulty.

Cases like this show why more and more foundries make radiography a routine practice. It proves their work sound—helps build a reputation for consistently good castings.

Wouldn't you like to know how Radiography can work for you? Get in touch with your x-ray dealer. Or, write us for a free copy of "Radiography as a Foundry Tool."

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(*Concluded from page* 210)

the diametric face of each wheel. An oil emulsion coolant is used in all finish grinding operations.

Castings then are cleaned in a horizontal, hooded and vented machine. A wire mesh belt carries them through a spray of cleaning solution at 150° F followed by a hot water spray. A blast of air dries the castings.

Castings are ground to ±0.005-in. or to user requirements and inspected visually and with go no-go gages. Operators then place castings in machines which magnetize, test and demagnetize them in quick sequence. Limits for production-line testing of magnet field strength are established by a ballistic galvanometer which integrates in one operation many factors in the theory of magnetic testing and thus does a more critical checking job than the routine testing equipment. It is located adjacent to the inspection and testing area.

Usually castings are demagnetized before counting, packing and labeling for shipment. Since magnetized metal is difficult to handle in processing operations, most companies who use magnets prefer to do their own magnetizing at the most convenient stage of their manufacturing operation. Occasionally, however, some orders are shipped magnetized at the customer's request.

ASM Instructs Teachers In Metal Technology

American Society for Metals has established a nationwide training program for teachers in the vocational and skilled grades, with the purpose of upgrading vocational and trade students by adding to the curricula of their studies a course in metal technology. The program is well under way, and has been carried out successfully in New York, Massachusetts and California.

It does not try to teach metallurgy, but introduces the subject of metals technology in courses covering welding, machining, drafting and other allied trades which involve metals. After taking courses in metals technology from teachers who have been trained under the ASM program, students of skilled trades will be able to enter industry as engineering associates or assistants, relieving top engineers of minor but time-consuming operations.

ASM provides teaching personnel for the training courses and has prepared text material for both teacher training and student use.

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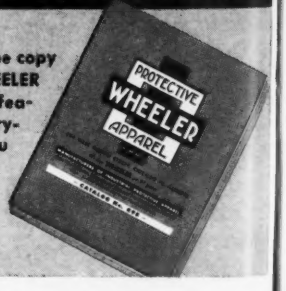
Send for free copy of the WHEELER BULLETIN featuring everything you need in SAFETY apparel.



Cut core costs...

double core production with

FOUNDREZ 7101

Your cores will cost less per ton, and bake out faster, if you switch from ordinary core oils to RCI's FOUNDREZ 7101 — a water-dispersing, phenol-formaldehyde binder.

Because FOUNDREZ-bonded cores bake out in about half the time of oil-bonded cores, you can double your production without adding any extra oven equipment.

What's more, you get a superior core. Tensile strength and hardness are greater. Permeability is increased. Gassing is reduced. Hot strength is higher. Less cereal binder is needed. And shake-out is better, saving time and material in cleaning finished castings.

Get the full facts on FOUNDREZ 7101 by writing for Technical Bulletin F-1.

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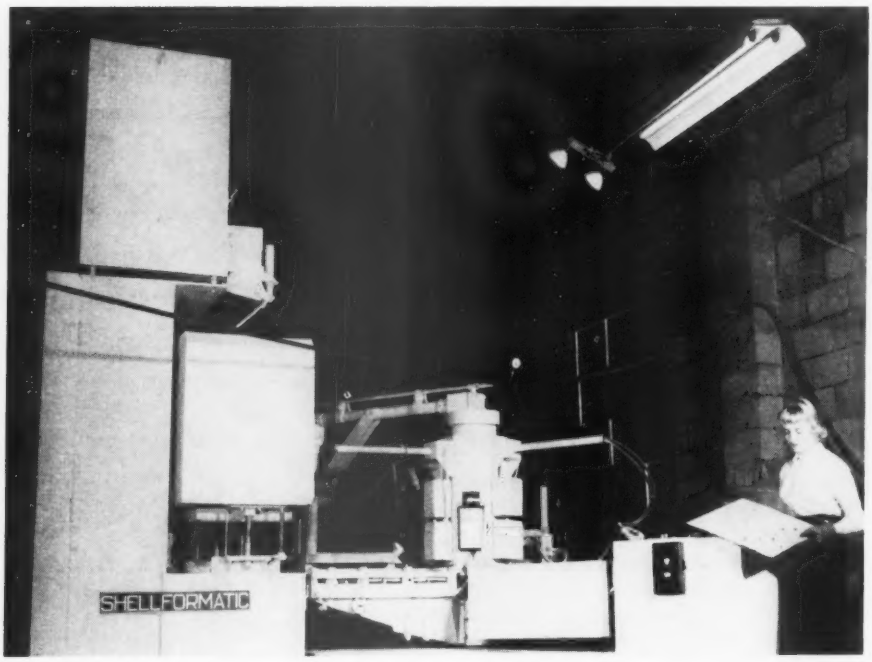
New EQUIPMENT an



Shell Molding: Beardsley & Piper Division, Pettibone Mulliken Corp., 2424 North Cicero Ave., Chicago 39—Line of automatic and semi-automatic shell mold equipment has been engineered and developed by the company in co-operation with the Shell Mold Division of the Winter Engineering Co., Buffalo, and that division has associated with Beardsley & Piper in the future development and sale of shell molding machinery and services. A complete line of single and multiple pattern shell mold machines and supplementary equipment will be offered. Consultation on shell molding problems also will be available.

For More Details Circle No. 1—Page 217

Gas Heater: Westinghouse Electric Corp., Air Conditioning Division, Dept. T-401, 200 Readville St., Hyde Park, Boston 30—Ceiling suspended, gas-fired unit heater operates independently of a central system heating plant and needs only simple electrical, gas and flue connections. Slow-speed motor and quiet fan provide maximum heat delivery at low noise level. Constructed of corrosion-resistant aluminized steel, heat exchanger tubes are designed to give top heat transfer with minimum resistance to air flow. Adjustable louvers provide heat distribution patterns which can be altered readily to suit varying conditions of occupancy or can be set to blanket drafty building openings. Seven sizes cover a range of capacities from 25,000 to 200,000 Btu per hour.

For More Details Circle No. 2—Page 217

Abrasive Belt: Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6—Heavily coated abrasive belt is said to combine characteristics of hand-coated glue and grain setup wheels and belts. Mineral buildup of the belt opens up under work pressure, presenting fresh abrasive grain particles to the work piece. Said to retain such advantages as precision coating, scientific mineral orientation, factory control and flexibility of use, the belt is available in grit 60 and grit 150 aluminum oxide mineral in all standard widths and lengths.

For More Details Circle No. 3—Page 217

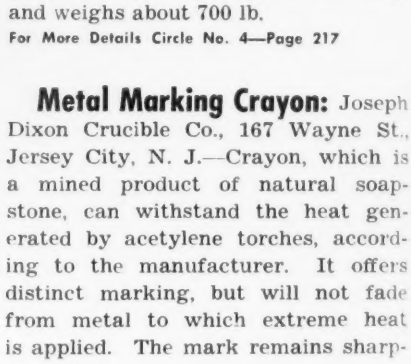
Metal-Cutting Saw: W. F. Obear & Son, 6075 South Normandie Ave., Los Angeles 44—Metal-cutting saw has a quick-acting, foot-controlled chain vise to hold material immovable during cutting, with only slight pressure by the operator. Material falls into place easily with a minimum of chucking, and a steel protective hood completely shields the wheel. The machine handles multiple cutting of material and cuts 2-in. steel or 4-in. cast iron pipe in 5 seconds. Dust is kept at a minimum by a ventilating duct. Two rows of lifetime lubricated ball bearings carry a statically balanced arbor. The rigid one-piece cast iron tilting table is balanced on a heavy cast pedestal, holding the arbor shaft permanently in line. Equipped with a 5-hp, 3-phase, 60 cycle, 220/240-v motor with manual pushbutton control, the saw is 30 in. wide, 48 in. long, 60 in. high and weighs about 700 lb.

For More Details Circle No. 4—Page 217

Metal Marking Crayon: Joseph Dixon Crucible Co., 167 Wayne St., Jersey City, N. J.—Crayon, which is a mined product of natural soapstone, can withstand the heat generated by acetylene torches, according to the manufacturer. It offers distinct marking, but will not fade from metal to which extreme heat is applied. The mark remains sharply etched.

For More Details Circle No. 5—Page 217

Soldering Furnace: Selas Corp. of America, Erie Ave. & D St., Philadelphia 34—Gas-fired soldering furnace using a radiant burner as a heat source is said to be capable of heating two 4-lb irons, in less than 8 minutes, from room temperature to 900° F, or one 4-lb iron to 1200° F, with a heat input of only



9100 Btu per hour. Burner location holds down mechanical shock and flux corrosion damage. Refractory hearth is easily removed and cleaned. The die-pressed furnace lining can be replaced quickly if necessary. Although heating is done without flame impingement, the soldering copper is surrounded by fully burned gases which virtually elimi-

UPPLIES

For More Details on These Items Use Reply Card—Page 217

nate oxidation and burning of the copper. Low heat input made possible by high heat transfer rates in radiant heat prevents high temperatures in furnace casting.

For More Details Circle No. 6—Page 217

Safety Glove: Wolverine Shoe & Tanning Corp., Rockford, Mich.—Safety glove uses the steel box principle employed in safety shoes to

provide protection from smashed fingers. Glove is light in weight, and the safety tips reportedly do not interfere with complete hand freedom. A steel tip is cemented into the tips of three fingers on each hand. Compression tests are said to have shown that each tip resists a pressure of 2 tons. As an aid to safety supervision, gloves are made of green sueded pigskin and clearly marked with a large label across the back. Tips of first, second and third fingers are punched so that the steel tips are visible.

For More Details Circle No. 7—Page 217

Corebox Vent: Wm. Demmler & Bros., Kewanee, Ill.—Company has added to its line a new type of corebox vent especially built for D-process shell molding. Made from stainless steel screen, 150 mesh, that needs no cleaning, it can be furnished in sizes from 3/16 to 1 in.

For More Details Circle No. 8—Page 217

Welding Rod: Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing, New York, N. Y.—Low-melting-point alloy is for use on cast iron for sealing cracks and for building up worn and poorly machined surfaces where strength is not required. Its advantages are said to include low bonding heat, quick tinning action, long working range and easy spreading. Used with a flux in paste form, it can be "painted" on the part. It also can be used with good results on bronze and steel castings and for filling and bonding any metals except aluminum and magnesium.

For More Details Circle No. 9—Page 217

Steel Shot: American Wheelabrator & Equipment Corp., 1102 South Byrkit St., Mishawaka, Ind.—Firm now is packaging and shipping

its steel shot abrasive in 50-lb fiber board cartons, rather than in 100-lb bags. Shipments are made on disposable pallets holding 1 ton of shot each. Cartons, 5½ x 5½ x 11 in., are said to resist puncturing and to keep moisture from rusting the shot. They are securely strapped to the

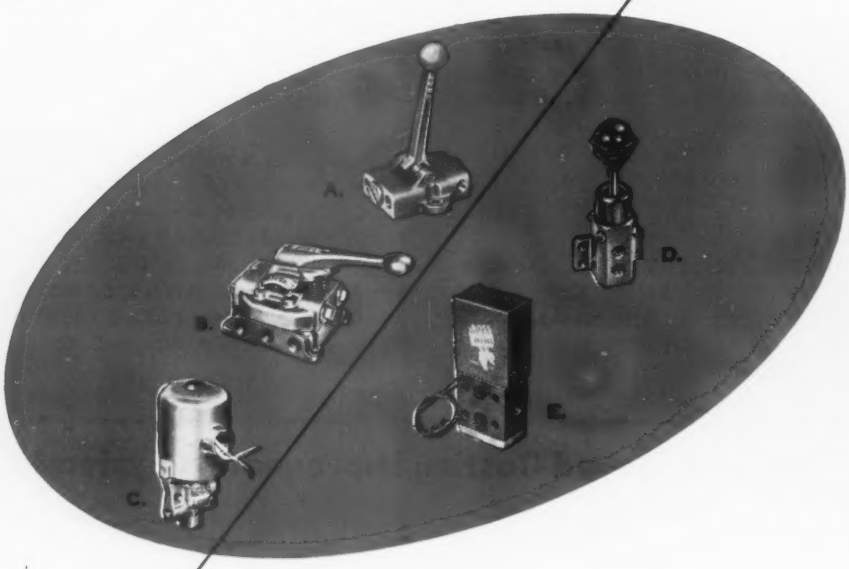
Offer Packaged Casting Impregnation Systems

COMPACT "packaged" system for impregnation of porous metals includes two low-cost models, one occupying 3 x 11 ft, the other 4 x 16 ft. Both units, mounted on steel platforms and skids, come installed with a complete line of necessary equipment such as impregnating tank, cleaning and rinse tanks, reservoir, vacuum pump, vapor trap, valves, gages and pipes. The impregnation method is based on polyester resins and a vacuum pressure cycle. Impregnant does not require refrigeration, agitation or aeration and maintains a constant viscosity at the ideal value required for castings. Said to assure positive pore penetration and not to be inhibited in the presence of copper-base alloys, it is nontoxic. These units are manufactured by the American Metaseal Mfg. Corp., West New York, N. J.

For More Details Circle No. 10—Page 217

IF IT'S A VALVE FOR FOUNDRY WORK— ROSS HAS IT

SMALL *Ross* VALVES SOLVE CONTROL PROBLEMS



Ross makes hundreds of valves especially designed for small, fast, single or double acting cylinder applications on all types of machine tools, jigs, fixtures, small punch presses and for remote pilot operation of large valves.

A. 600 series—three-way or four-way—hand and foot—¼" pipe—horizontal or vertical handle—single or double treadle.

B. 880 series—three-way or four-way—hand and foot—¼" and ⅜" pipe—horizontal or vertical handle—single or double treadle.

C. Inline direct operated solenoid — straight-way and three-way — normally open and normally closed —⅛" pipe.

D. Straight-way or three-way normally closed — ¼" pipe — various heads.

E. Four-way direct operated solenoid—¼" pipe—can be converted to three-way by plugging cylinder port.

Large or small—Ross has the most complete line of operating valves in the industry. Ask Ross for any air control information.

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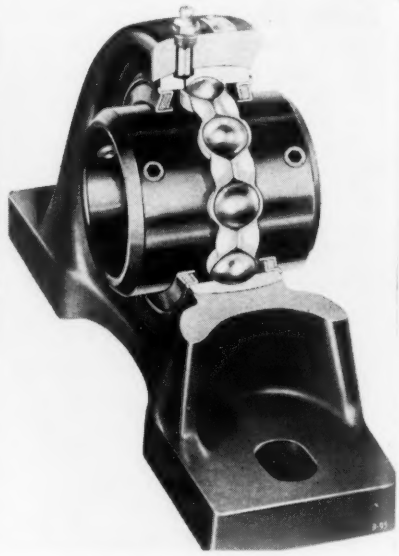
pallet, making a single unit. Lifting and pouring are claimed to be facilitated, and danger of falling on spilled shot or of puncturing hands on wire bag closures is decreased. Pallets are 30 x 48 in. and can be stored four or five high, thus saving storage space.

For More Details Circle No. 11—Page 217

Ball Bearing Units: Stephens-Adamson Mfg. Co., Aurora, Ill.—"Zone hardened" ball bearing units with double extended race feature induction heat treating of the inner race ring through the ball path section only, permitting hardened threads of set screw to bind tightly against soft, unaffected threads of the race. Double extension of the inner race ring affords good support of bearing on shaft and reportedly guarantees a positive lock between the inner race of the bearings and the shaft. The lock reduces shaft wear and fretting corrosion and helps to cut downtime. Shock and vibration resistance are increased.



For More Details Circle No. 12—Page 217

Beryllium Products: Beryllium Corp., Dept. 3K, Reading 8, Pa.—New beryllium-copper alloy is said to answer the need in metal industries for a copper-base material of low beryllium content that combines properties of the high strength and the high conductivity groups. Other products include a flake form of metallic beryllium that is 99.5 per cent minimum pure. This flake form renders the metal particularly ductile, making it especially suited to such fabricating operations as hot pressing. A high purity beryllium oxide is suitable for refractory shapes and ceramic bodies and for use as a catalytic agent. A ferro-beryllium master alloy contributes to the hardenability of

(*Continued on page* 219)

AVAILABLE FOR THE ASKING—This reader-service is designed to provide foundrymen with "idea" and reference material. Listings are selected from company product literature and reprints of special FOUNDRY editorial articles.

71. Gas-Fired Heater

Drying Systems, Inc. — Drying, baking, annealing and other heat treating processes can make use of the I-D-L gas-fired heater. Designed to heat air up to 1600° F, unit employs the convected heat principle. Two sizes are made: 100,000-350,000 Btu per hour and 350,000-1,000,000 Btu per hour. Read 8-page illustrated bulletin H-101 for facts and figures and application information.

72. Lathes, Grinders, Buffers

Bradford Machine Tool Co.—Metalmaster lathes, grinders and buffers are described and illustrated in 28-page catalog M. Specifications and design features are included, along with accessories. Machines included in line are various types of pedestal and bench grinders, variable speed snagging grinders, combination grinder-disk grinders and heavy duty buffer-polishers.

73. Snagging Wheels

Mid-West Abrasive Co.—Provided with a fiber-cushioned arbor hole, resinoid-bond snagging wheels are described in 4-page illustrated catalog. Cushioned feature helps eliminate vibration and reduce machine wear. A complete size range is available.

74. Head & Eye Protection

Chicago Eye Shield Co.—64-page illustrated catalog No. 27 shows complete line of head and eye protective equipment. This includes safety glasses, goggles and face shields, welding helmets, respirators, masks, hoods, aprons, sleeves and grinder guards.

75. Colloidal Graphite

Acheson Colloids Co.—Among the applications of "how-to-do-it" style bulletin No. 426 showing "dag" colloidal graphite in metalworking are die casting, ingot mold stripping and cutting. Graphoid lubricating films are unaffected by heat up to 5000° F in inert atmospheres.

76. Air Compressors

Gardner-Denver Co.—Illustrated bulletins HAC 40 and HAC-36 cover single and two-stage horizontal air compressors. Construction features and installations are shown. Single-stage units have ratings between 150 and 20 psi at displacements up to 1292 cfm, and two-stage units are rated at 110 psi at deliveries up to 1854 cfm.

77. Melting Furnaces

Lindberg Engineering Co.—In 12-illustrated pages, bulletin 551 depicts various types of oil and gas-fired smelting furnaces, including standard and special purpose types such as a two-chamber induction unit for nonferrous metals. Complete details are given and accessories are also shown.

78. Aluminum Selector Chart

U. S. Reduction Co.—Properties of any of 23 different aluminum alloy compositions can easily be found by use of available selector chart of slide rule type. Mechanical and physical properties are shown for sand, die, and permanent mold cast forms of the alloys, together with suggested type of application for each.

79. Conveyor-Elevators

Stephens-Adamson Mfg. Co.—60-page illustrated catalog No. 140 contains an exhaustive study of Redler conveyor-elevators for moving pulverized, granular, small lump or flaky materials in any direction or combination of directions. Complete data are given on both application and design problems, with many informative drawings and application photographs.

Additional Information?

For additional information on any of the items described under "New Equipment and Supplies," "Trade Publications" or "Helpful Literature" in this issue—simply circle corresponding item numbers on one of these cards

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80. Chills

Fanner Manufacturing Co.—Illustrated catalog No. 1153 of 32 pages shows an exhaustive line of chills. General engineering information on use is given, together with complete specifications and ordering information. Line includes nails, spiders, sections, half round and ram-up chills and core ties.

81. Temperature Controller

Claud S. Gordon Co.—For close and continuous control of heat in ovens, furnaces and kilns, indicating and recording temperature control instruments are shown in 4-page illustrated Xactline catalog. Details are given on four different models.

82. Vibrating Screen

Universal Vibrating Screen Co.—Illustrated bulletin No. 65 gives quick outline of features of Uniflex 24 x 36 in. universal vibrating screen. Vibration rate is 1800 cycles per minute, and one or two decks can be used. Parts drawings show construction method.

83. Chemically Coated Sand

International Minerals & Chemical Corp., Eastern Clay Products Dept.—Westonite chemically coated sand, a molding material for producing castings from ounces to tons in green sand, skin dried and dry sand molds is effectively described in 6-page folder. Its use in jobbing shops as well as mechanized foundries is related. Supplementary 6-page bulletin describes "Westonite in Heap Sand Operation."

84. Lift Trucks

Lift Trucks Inc.—Brief description, illustration, specifications and features of construction are presented on pallet, platform, tractor and straddle stacking models of lift trucks in 20-page brochure. Special models are shown, the Dyna dual power unit is described and single and multiple stroke hand lift models are covered as well. Capacities range from 1000 to 6000 lb.

85. Handling Boxes, Platforms

Republic Steel Co., Pressed Steel Div.—"Strength where it is needed," describes construction feature of steel boxes and skid platforms reviewed and illustrated in 12-page catalog P-80. Covered also are units for crane handling, for tiering, special purpose boxes and racks as well as steel pallets.

86. Overhead Handling

Cleveland Crane & Engineering Co., Cleveland Tramrail Div.—"Engineering and Application Data" relative to versatile line of overhead materials handling equipment are contained in 12-page illustrated form 2008-J. Chief items covered include rail and arch beams, carriers for hand and electric operation tramrail tractors, switches, cranes and transfer cranes, gantry cranes, buckets and grabs.

87. Foundry Equipment

Jeffrey Mfg. Co.—64 pages describing and illustrating various type foundry equipment comprise catalog 845. Main sections cover typical handling systems, mold preparation equipment, mold handling equipment, casting handling equipment, unit machinery for foundry service and sand reclamation equipment.

88. Refractory Gun

Blastcrete Service Co.—Fines, ⅜-in. sand and refractories can be handled by the Blastcrete gun and angle nozzles, described and illustrated in 4-page folder. Gun will place from ¾ to 6 cu yd per hour. Angle nozzles can be efficiently used in small and large cupolas.

89. Loading Attachment

Baker-Lull Corp.—6-page folder AD-32C shows feature of Shoveloader attachment for industrial wheel type tractors. Four models in high and low-lift types fit popular makes of tractor. Four-page supplement shows such attachments as pavement ripper buckets, bulldozers, lifting cranes, fork lift attachments and snow plows.

90. Crane Cab Coolers

Dravo Corp.—Line of crane cab coolers and conditioners described in illustrated 24-page bulletin 1301 maintains comfortable working conditions and supplies clean air under all atmospheric and temperature variations. Specifications and how and where to use the various models are given.

91. Air Control Products

Scovill Mfg. Co., A. Schrader's Son Div.—Series of five multipage illustrated catalogs in sectional catalog No. 20 contain detailed information on couplers, blowguns, hose and airline fittings; air ejection sets; pneumatic press controls; air cylinders and operating valves; and four-way valves. Price list for all industrial products is included.

92. "Sound Casting" Briquettes

Carborundum Co.—"Ferrocarbo Briquettes for Improved Machinability of Gray Iron Castings" is an illustrated 24-page bulletin which relates how this product produces sound iron castings with required strength, ductility and hardness properties. Liberal use is made of photomicrographs.

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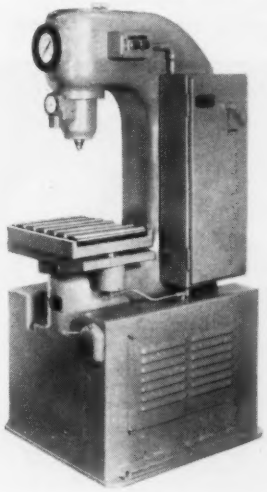
(*Continued from page* 216)

stainless steel. It is designed for corrosion-resistant casting applications and other uses involving relatively high temperatures.

For More Details Circle No. 13—Page 217

Hardness Tester: Steel City Testing Machines Inc., 8817 Lyndon Ave., Detroit 21—Brinell hardness testing machine designed to fit directly into a conveyor system is reported to facilitate handling of parts



and to speed up testing. A roller conveyor is arranged in conjunction with the anvil of the tester, which consists of a series of hardened steel bars firmly affixed to the lower portion of the machine's "C" frame. Rollers of the conveyor are interspersed between these bars and are lowered and raised automatically during the testing cycle. Machine is motor driven and hydraulically operated. Direct reading dial on the unit makes it unnecessary for the operator to measure the diameter of the brinell impression during production testing. This dial is actually a comparator indicator which indicates the depth of the impression.

For More Details Circle No. 14—Page 217

Nonskid Paint: Colonial Refining & Chemical Co., NBC Bldg. Cleveland 14—Plastic liquid paint which incorporates grit of near-diamond hardness is said to prevent slipping and skidding on all types of floors, including wood, metal, or concrete, even when floors are wet. It is brushed on in one coat, requires no primer and covers from 75 to 100 sq ft per gallon. Available in red or gray, it is resistant to oil, grease, alcohol and water. At normal room temperature, it dries in 10 hours.

For More Details Circle No. 15—Page 217

Radiant Tube Burner: North American Mfg. Co., 4455 East 71st St., Cleveland 5—Radiant tube gas

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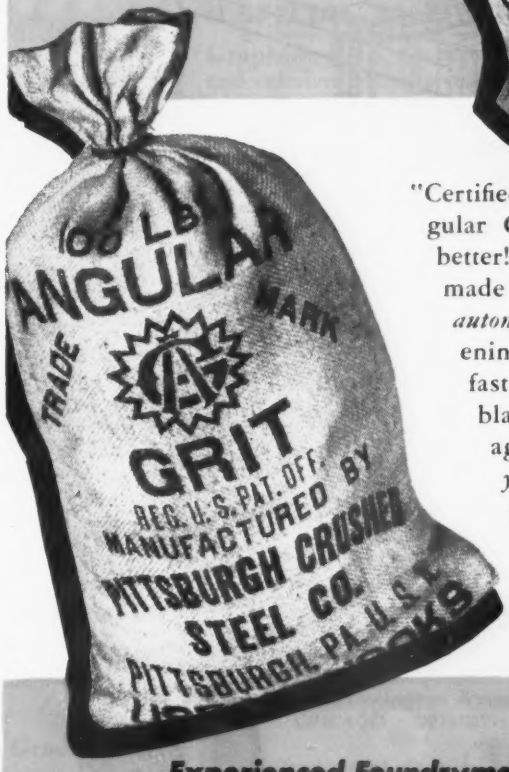
CLEAN and CLEAN and CLEAN and CLEAN!



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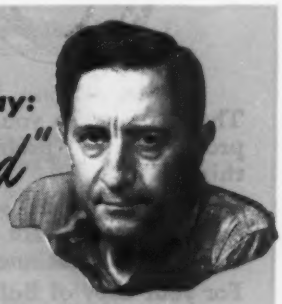

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burner is a sealed-in unit designed for use with 4-in. or larger radiant tubes in furnaces where control of atmosphere is important. Burner is sealed into one end of the radiant tube, which passes through the furnace and discharges the combustion products at the far end, outside of the furnace. The furnace is heated solely by radiation from the hot tubes. Because the burner itself uses gas at zero pressure, the installation as a whole requires only a few ounces of gas pressure, to take care of the pressure drop across the gas regulator. Sealed burner gives furnace operator complete control over the air-gas ratio.

For More Details Circle No. 16—Page 217

Wheel Packing: Electro Refractories & Abasives Corp., 344 Delaware Ave., Buffalo 2—Company is offering its customers a choice of a new method of packing grinding wheels for shipment. Wheels customarily have been shipped lying flat on top of one another in a sealed wooden container filled with sawdust or other packing material. The new system involves shipping them in an upright position in an open rack built upon a pallet. The following advantages are claimed for it: Wheels are less likely to break or chip; an open rack is easier to open and to handle; elimination of packing waste cuts unpacking cost and helps to keep a plant clean; racks can be placed in tiers, saving floor space.

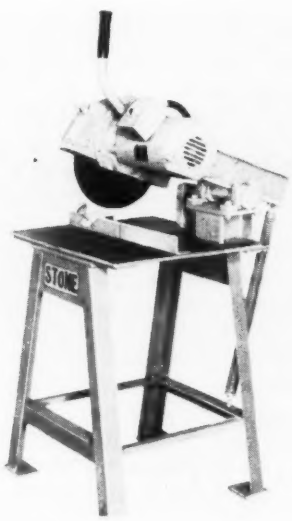
For More Details Circle No. 17—Page 217

Air Vibrator: Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland —Company has added to its line of

air vibration equipment a compact, portable unit which can be attached quickly to a railroad car or other material handling device. Easy to handle and to operate, it can be used after material has been removed to keep it moving from or into hopper, bins and chutes.

For More Details Circle No. 18—Page 217

Cutoff Machine: Stone Machinery Co., 606 Fayette St., Manlius, N. Y.—Cutoff machine is equipped



with a 3½-hp, geared-in-head motor. The direct drive permits delivery of full power to the cutting edge, with fast cutting speeds and long wheel

(*Continued on page* 222)

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25% Grade—recommended for cupola or electric furnace additions.

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75%, 80/85%, 85/90%, 95% Grades—for graphitization, inoculation and structure control of gray cast iron.

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FERROVANADIUM ALLOYS

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V-5 Foundry Alloy—an alloy of chromium, manganese and silicon highly effective for controlling structures, increasing strength and reducing chill in cast iron.

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Pittsburgh • Cleveland • Cincinnati • Columbus • Toledo

(*Continued from page 220*)

life. The machine uses a 12-in. abrasive wheel for cutting ferrous metals and a 12-in. steel saw blade for nonferrous metals. Capacity in ferrous is 1½-in. solids, 2½-in. OD pipe and 2½-in. structurals. In nonferrous, capacity is 2½-in. solids and 3-in. tubing and extrusions.

For More Details Circle No. 19—Page 217

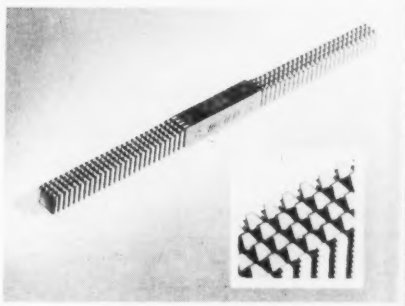
Enclosed Motor: Lima Electric Motor Co., Dept. 112, Lima, O.—Totally enclosed, fan-cooled motor is available in ratings of from ¾ hp at 900 rpm to 20 hp at 3600 rpm in NEMA frame sizes 224 to 326 inclusive. Features include rigid cast-iron frames with integral feet; deep, integrally cast fins providing extra heat dissipating surface and double width, prelubricated ball bearings that require no greasing or cleaning for normal life. A cast aluminum fan provides high-velocity air over the cooling fins, preventing foreign matter from accumulating on motor frame. Either 2 or 3-phase models, at all standard frequencies and commercial voltages below 600 v, are available. Motors can be supplied for vertical, wall or ceiling mounting as well as for standard, horizontal floor mounting.

For More Details Circle No. 20—Page 217

Power Tool Bench: Morrison Products Inc., 16816 Waterloo Rd., Cleveland 10—Line of benches for power tools offers two sizes which cover the complete range of sizes required for mounting the standard line of small power tools used by industry. They are adjustable to obtain proper working height for each tool and to accommodate a wide range of working centers. Construction is of 12-gage, die-formed welded parts.

For More Details Circle No. 21—Page 217

Thread Restorer: Beiff & Nestor Co., Lykens, Pa.—Thread restoring tool is said to restore damaged or deformed external threads to original



condition without reducing the root and outside diameters. A few quick passes across the damaged threads with the tool remove burrs and deformed metal and reshape threads. Made of hardened steel, the device is 8½ in. long, 7/16 in. square and covers a range of eight thread sizes. One model is for 11, 12, 13, 14, 16, 18, 20 and 24 threads per inch, and another is for 9, 10, 15, 16, 20, 26, 28 and 32 threads per inch.

For More Details Circle No. 22—Page 217

Cab Air Conditioner: Lintern Corp., Route 20 East, Painesville, O.—Crane cab aid conditioner available in self-contained and split unit types is reported to maintain normal temperatures in crane cabs operating in temperatures up to 140°F and to provide complete air filtering under dust and gas conditions. It can be installed and connected by a competent refrigeration service man.

For More Details Circle No. 23—Page 217

Blower: Hartzell Propeller Fan Co., Piqua, O.—Vaneaxial blower can be used to move air at temperatures up to 350° F or to move air containing acids, alkalies or fine abrasive dust without premature failure of belts and bearings. Available in a

(*Continued on page 224*)

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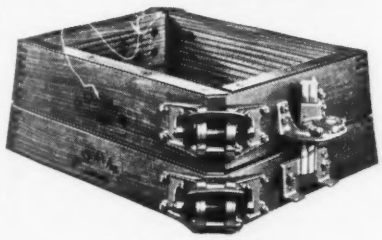

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SIX separate models of a tractor shovel or front-end loader for applications involving the handling of bulk materials range up to 2¼ cu yd in capacity. They include 15-cu-ft and 1-cu-yd models with bucket drive and rear wheel steering, a 1-cu-yd model with rear wheel drive and bucket steering and 1, 1⅝ and 2¼-cu-yd models with four-wheel drive and rear wheel steering. All will utilize a new transmission which incorporates a torque converter with a 3 to 1 torque multiplication factor. A constant mesh type with full-pressure lubrication, it is operated from two manual control levers on the steering column. Another lever, emerging through the floor board, controls the overdrive. Speed is up to 28 mph. Design of the units makes it possible to remove any major component without disturbing others. The 1-cu-yd model with four-wheel drive and rear wheel steering is shown here. Manufacturer of this equipment is the Construction Machinery Division of the Clark Equipment Co., Buchanan, Mich.

For More Details Circle No. 24—Page 217

(*Continued from page* 222)
range of sizes from 12 to 54 in., these high-temperature units deliver the same volume of air as the firm's standard models. Addition of a special dummy section containing the guide vanes makes possible the location of the drive on the negative pressure side of the blower. With this arrangement, clean air from outside the duct is drawn in through the belt tube and over the bearings.

For More Details Circle No. 25—Page 217

Fork Lift Trucks: Towmotor Corp., 1226 East 152nd St., Cleveland 10—Company has made many basic refinements in its regular series of large-type fork lift trucks. Installation of new types of carburetor, degasser and mechanical governor is said to result in improved performance. An oil bath type air cleaner replaces a unit using only air and causes greater efficiency. A strong single-belt generator drive replaces a double-belt drive. Easier access to the engine area has been made possible by mounting the seat on a hinged cover so that the hood or cover can be lifted or tilted easily. Other new features include an improved, hand-operated parking brake, repositioning of the instrument panel for greater visibility and doubling of drag-links strength.

For More Details Circle No. 26—Page 217

Cut Wire Shot: Harrison Abrasive Division, Metals Disintegrating, Elizabeth, N. J.—Uniform in size and in hardness, abrasive shot for cleaning, peening, tumbling, cutting or abrading is cut from high-grade wire to form cylinders with diameters equal to lengths. Uniformity of size is said to mean that each particle provides the same impact and the same finish. Manufacturer claims that the shot will last for thousands of impacts and that only a small quantity is required. It is available in steel, copper and stainless steel in a range of wire diameters from 0.0625 in. to 0.020 in., with a minimum hardness range for the steel shot of from 36 to 46 Rockwell C, depending on the wire diameter. For special applications, it can be produced from any type of wire desired.

For More Details Circle No. 27—Page 217

Tool Bits: Besly-Welles Corp., Beloit, Wis.—Ground high-speed steel tool bits have been added to the firm's line of cutting tools and are available as finish ground bits in ten sizes of squares from 3/16 to 1 in. accurately ground to 0.001 in. for ease in alignment. Made from a molybdenum-tungsten alloy, the bits are said to have excellent red hardness characteristics, resistance to abrasion and unusual toughness.

For More Details Circle No. 28—Page 217

Hydraulic Crane: Austin-Western Co., Construction Equipment Division, Baldwin-Lima-Hamilton Corp., Aurora, Ill.—Tractor mounted hydraulic crane combines features of crawler, truck and erection cranes with those of industrial shop cranes. All movements are actuated by hydraulic power, as is the steering. The telescopic boom can be raised from the horizontal to an angle of approximately 45° or to any intermediate

(*Continued on page* 226)

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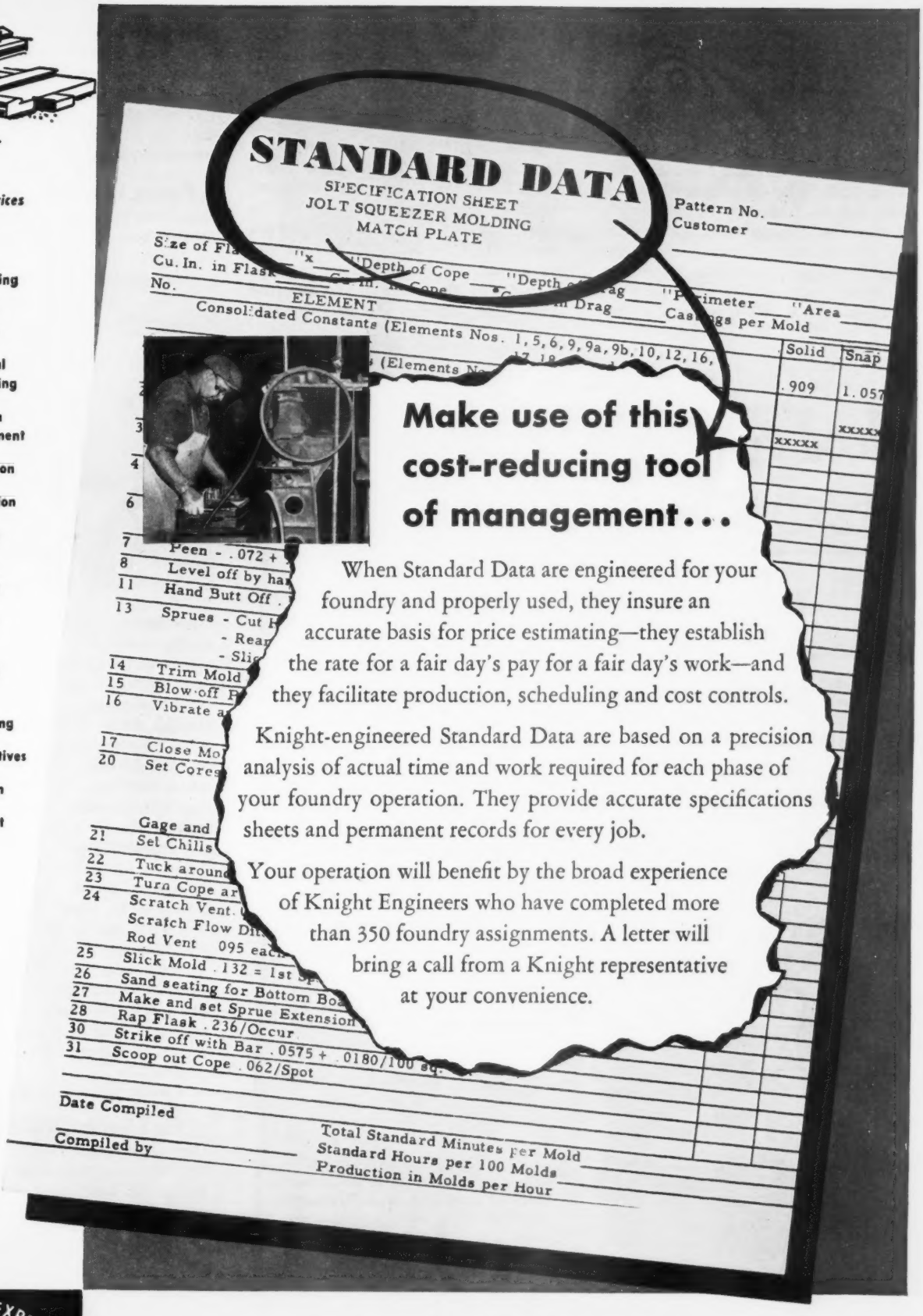

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(*Continued from page* 224)

point and is continuously rotatable through a full 360°. Angle of the boom is changeable while the unit is operating under load. The crane can lift and transport its maximum load —as much as 4 tons at 10-ft radius —any distance through low clearance doors. Then, with boom extended, the hook can be raised 24 ft or lowered 30 ft below ground level. Crane has full reverse 3-speed transmission and can be equipped with either gasoline or diesel engine. Steerable at both front and rear, it turns in 15-ft radius. Weight is approximately 18,000 lb, and traveling speeds range from 5 mph in low to approximately 15 mph in high.

For More Details Circle No. 29—Page 217

Blacklight Lamps: Ultra-Violet Products Inc., 145 Pasadena Ave., South Pasadena, Calif.—Line of ultraviolet ("blacklight") lamps is designed for use in difficult inspection procedures, flaw detection, control and processing, for invisible marking and coding and for other manufacturing operations. Lamps are noninjurious, harmless to eyes or skin and have no deleterious effects on products. They burn cool, start and restart with no warmup or cooling-off period required, and range in size from 4 to 120 w. Replaceable tubes last 3000-6000 hr.

For More Details Circle No. 30—Page 217

Power Wheelbarrow: Kwik-Mix Co., 3029 West Concordia Ave., Milwaukee 16—New safety and performance features have been incorporated in the company's power wheelbarrow, which can be converted to a flat bed or a fork lift truck. Dead man internal expanding brake system instantly stops all machine movement when the operator's foot is off the treadle. On the fork lift version, and optionally on the other types, soft core rubber tires on all wheels add to the driver's comfort and eliminate the possibility of punctures and blowouts. A cog-type V-belt of rayon cord construction furnishes more efficient transmission of power from the 6-hp engine to the drive wheels and reduces belt stretch and slippage. Other features include a vertical clutch control lever with neutral, forward and reverse positions, a higher steering wheel, an inspection door in the front panel of the cowl and other innovations.

For More Details Circle No. 31—Page 217

Air Line Separator: Wilkerson Corp., 3367 South Platte River Drive, Englewood, Colo.—Improved automatic air line moisture separator is said to separate and discharge all nongaseous contaminants from any air line without attention from plant personnel. Using stored air pressure for actual discharge of accumulated water and sludge, the separator uses so little air that pressure drop is negligible. The one moving part of the device is actuated by a flexible diaphragm. A replaceable filter serves to trap any moisture which might escape the main condensation chamber. Principle of the unit is the tendency of compressed air to

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. . . then use TRANSITE CORE PLATES that are light-weight and easy to handle

You'll find two important reasons why Transite* Core Plates mean faster production: First, core makers can handle more plates with fewer trips. Second, Transite Core Plates are easier to clean . . . core wash, sand, etc., do not adhere to them as readily as to other core plate materials.

Here are more *reasons why you can profit by using Transite Core Plates:*

They give long service—Made of tough, fibrous asbestos and cement, Transite Core Plates resist shock and corrosion—will not crack or break easily—require little, if any servicing. *Performance records of 8, 10 and 12 years are not unusual.*

They maintain accuracy — Transite Core Plates stay smooth through long, hard service. Foundrymen who have used them for years report minimum warpage.

For cores of large mass and small surface area, perforated Transite Core Plates are also available to eliminate green cores and reduce baking time. For full details write Johns-Manville, Box 60, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

*Reg. U. S. Pat. Off.

Johns-Manville TRANSITE CORE PLATES

Made of Asbestos

hold moisture as vapor until introduced into an enlarged area or chamber where it condenses, forming rust and sludge. Sizes available are for ¼, ⅜ and ½-in. air lines.

For More Details Circle No. 32—Page 217

Yard Light: Abolite Lighting Division, Jones Metal Products Co., West Lafayette, Ind.—Yard light mounts on vertical surfaces and is supplied with reflector, socket, socket holder, pipe bracket, wall fitting and insulators. Deluxe model features an inside surface finished in white titanium porcelain enamel; standard model is available with a baked enamel finish. Easily assembled and installed, the unit has many inside as well as outside applications. Any standard lamp can be used with it. Two reflector sizes are available—a 12-in. diam reflector for 60 to 100-w lamps and a 14-in. diam reflector for 150-w lamps. Socket holder and wall fittings are made of cast aluminum.

For More Details Circle No. 33—Page 217

Programming Control: Combustion Control Corp., Dept. N, 718 Beacon St., Boston 15—Programming control for gas, oil or combination gas-oil burners is said to provide complete protection against flame failure explosions together with programming to meet any application requirement. It cuts off fuel 2 to 4 seconds after a burner flame goes out. Specification, installation and maintenance are simplified because the device provides a single standard package unit with completely automatic startup, operation and shutdown control for any type of burner and a selection of programming times for three types of ignition operation.

For More Details Circle No. 34—Page 217

Air Heater: Portable Heater Sales, American Air Filter Co., Moline, Ill.—Redesigned standard model

portable air heater is powered with a new Briggs & Stratton model 6 engine, use of which permits modification in engine mounting, resulting in a simpler, cleaner arrangement of

Faster... Safer...
AIR HOIST

Lift 1000 lb. loads *faster* . . . *safer* . . . and quieter . . . with ARO Air Hoists! Betters all safety requirements . . . motor explosion-proof. Small, compact, overall length 10¼" . . . weighs only 28½ lb. Vane-type motor, totally enclosed.

Saves time and labor for shipping docks . . . heat treating departments . . . refineries, chemical plants and plating departments . . . machine shops and foundries . . . appliance, furniture, textile, automobile and aircraft assembly lines . . . stock rooms.

SEE YOUR ARO DISTRIBUTOR

FASTER . . . wide speed range. Quieter, too.

SAFER . . . no spark hazard . . . safety construction throughout.

SMALLER . . . one man can easily install.

MORE USEFUL . . . unaffected in ordinary operation by dirt, fumes or heat.

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THE ARO EQUIPMENT CORP., BRYAN, OHIO

Please send full details on the new ARO Air Hoist, without obligation.

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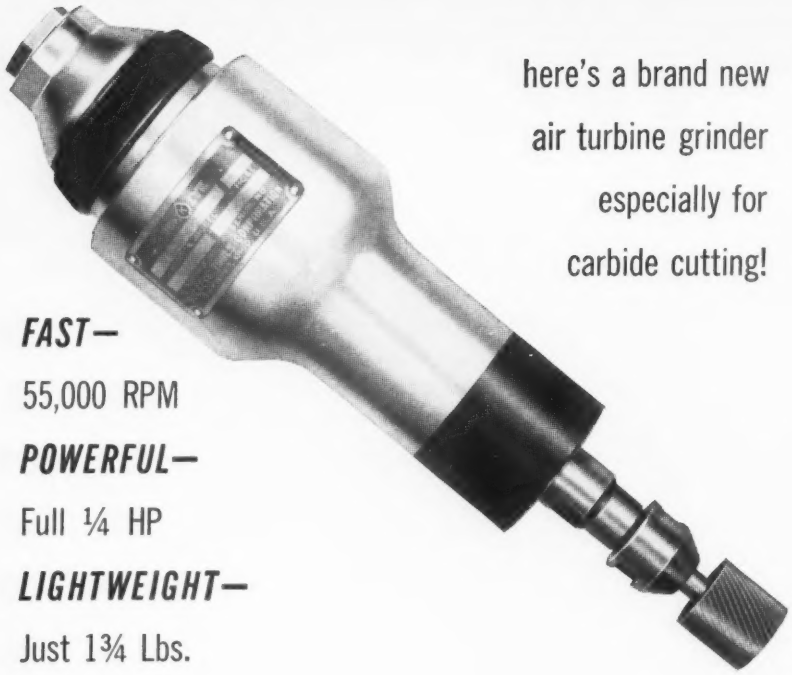
in air turbine grinders

YOUR BEST BUY IS BUCKEYE



here's a brand new air turbine grinder especially for carbide cutting!

FAST—
55,000 RPM

POWERFUL—
Full ¼ HP

LIGHTWEIGHT—
Just 1¾ Lbs.

More power per pound! That's the reason the NEW Buckeye Air Turbine Grinder will cut through grinding jobs faster, with less effort for the tool operator. Versatile—designed for use with tungsten carbide burrs, adaptable to use with rotary files and midget mills, may be mounted on tool post, takes mounted points up to ¼" shank.

Write NOW for complete information on this NEW addition to the Buckeye Tools line of 56 portable air-powered grinders.

bearings sealed in grease—
NEVER REQUIRE LUBRICATION

use with tool post holder—
MORE ACCURATE GRINDING

efficient turbine bucket design—ALWAYS RUNS COOL

operates without vibration—
EASY TO HANDLE

aluminum housing, steel front sleeve for longer wear—
LIGHTWEIGHT, DURABLE

Buckeye Tools CORPORATION
DIVISION 20 • DAYTON 1, OHIO

producers of the world's first successful rotary air tools

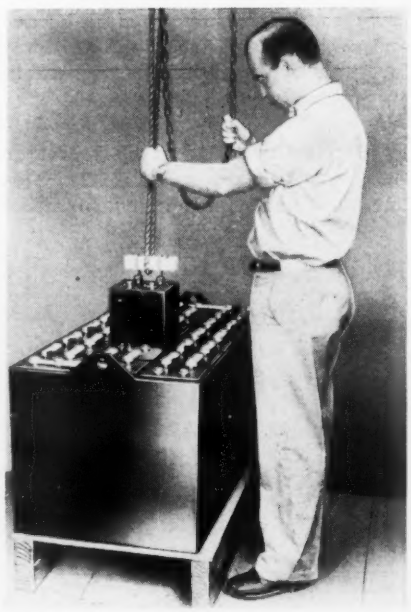
components at the air intake end of the heater. A fuel metering valve has been added that can reduce capacity of the unit from a maximum of 385,000 Btu to a low of 100,000 Btu per hour. The standard model is the only self-contained, gasoline-fired unit in the line. It is suited where electricity is not available and where easy portability and spot heating in the ducts are important factors.

For More Details Circle No. 35—Page 217

Floor Surface: Flash-Stone Co., 3723 Pulaski Ave., Philadelphia 40—Floor consisting of steel plates approximately 1-ft square embedded in especially installed concrete is claimed to provide a wear-resistant surface suitable for use in areas subjected to severe industrial use. The steel plate has numerous anchorage points that secure the plate to the concrete and prevent buckling or movement either vertically or horizontally. This floor is equally suitable for surfacing over old and new concrete, sound wood bases, wood block or brick, with some variation in the material selection in the basic grouting courses in which the plates find permanent anchorage. The design permits small, protected islands of the grouting concrete bed to surface and to form an effective non-skid pattern.

For More Details Circle No. 36—Page 217

Cell Puller: Gould-National Batteries Inc., Trenton, N. J.—Cell puller is useful in removing storage bat-

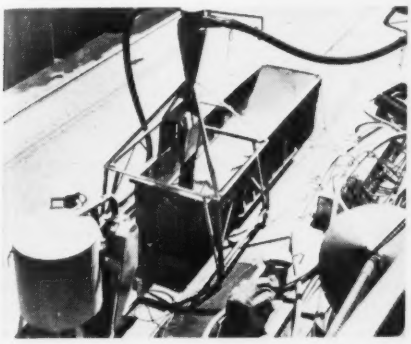


teries for examination or repair. Generally used in sets of two, the tool consists of a U-shaped steel loop brazed to a hexagonal steel nut with specially cut threads that taper from bottom to top. The nuts are screwed

down over the lead posts, a piece of wood is placed in the loops, and the cell is pulled from the battery by a chain or rope. The same tool is used with hold-down clips for removing the elements from the jar.

For More Details Circle No. 37—Page 217

Pneumatic Conveyor: Vacu-Blast Co., P. O. Box 885-R, Belmont, Calif.— Pneumatic conveyor which conveys up to 40,000 lb per hour of



sand or any other granular material requires only one man to operate it. Pneumatic vacuum action is continuous until the supply of material is exhausted. Guiding the pickup nozzle is the only manual operation. The unit uses a flexible hose that will go around corners and other obstacles and conveys up to 150 ft vertically and 200 ft horizontally. It is completely portable. Power can be derived from electric motor or gasoline or diesel engines. The nozzle operates up to 350 ft from the unloader unit, and vacuum and dust collector units may be located an additional 300 ft from the unloading point if necessary.

For More Details Circle No. 38—Page 217

Inventory Machine: Remington Rand Inc., 315 Fourth Ave., New York 10—Electronic device is said to reduce to a fraction of a second the time needed to check an entire inventory. It is housed in a small cabinet, about 7 ft long by 6 ft high, and has ten keyboard devices that look like hand adding machines and feed information into the system. The unit receives ten tallies of orders, or inventory items, through the keyboards and within 0.4 of a second it adds the new items to the existing total in their proper catalog classifications and registers the new total. It can handle 13,000 items in each of three categories—orders, cancellations and current inventory balances.

For More Details Circle No. 39—Page 217

Power Sweeper: Cheston L. Eshelman Co., 119 Light St., Baltimore 2—Completely motorized power sweeper is specifically designed to do an effective sweeping job on large pavement and floor areas. It reportedly will pick up metal shavings.

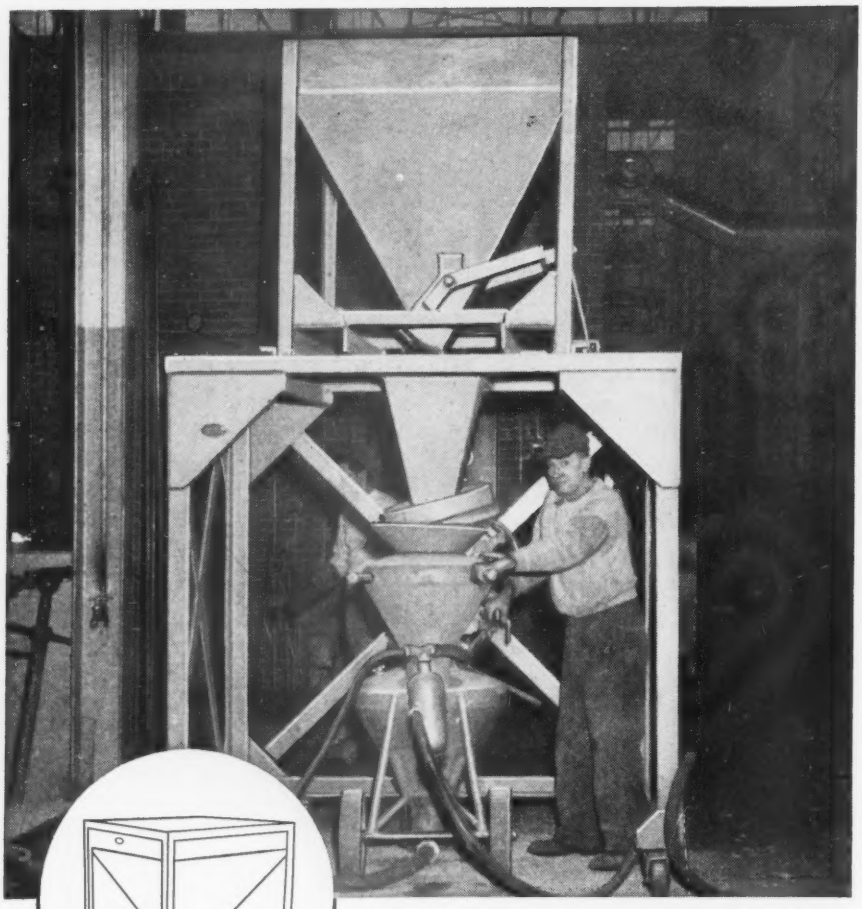
HAUSFELD
FURNACES

FOR "ALL-OUT" PRODUCTION
IN NON-FERROUS FOUNDRIES

Provide the
Utmost in Speed
Production
and Safety

FURNACES FOR
BRASS • ALUMINUM • MAGNESIUM
AND ALL OTHER
NON-FERROUS ALLOYS

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO



Specially designed hopper bucket makes cupola lining more efficient. Bucket is placed on frame by use of a lift truck.

Solve Your Material Handling Problems With PENN IRON SPECIAL EQUIPMENT

In lining cupolas, Textile Machine Works foundry in Reading, Pennsylvania, had difficulty handling the clay mix used with their Bondactor equipment. After a study of the problem, Penn Iron Works, Inc., designed, engineered and manufactured this special hopper bucket for maximum handling efficiency.

Whatever the bulk-material handling problem in your plant, Penn Iron Works, Inc., will be glad to help with its solution. Our wide experience in designing and manufacturing all types of buckets and special handling equipment for foundries can help you cut costs . . . save time . . . increase efficiency.

For Further Information Write:

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

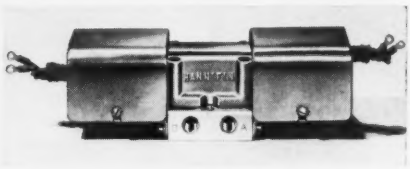
PENN IRON WORKS, INC.

READING, PENNSYLVANIA

The unit comes with an all-metal hopper that snaps on the front of the brush and has a 100-lb capacity. The hopper can be unsnapped for emptying by one person and has a carrying handle on each side. Brush is 10 in. in diam, 36 in. long and is chain driven.

For More Details Circle No. 40—Page 217

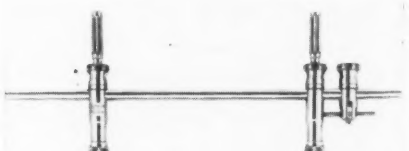
Poppet-Type Valves: Hannifin Corp., 1176 South Kilbourn Ave., Chicago 24—New ¼-in., four-way pop-



pet-type valves, direct solenoid operated, are recommended for speeds as high as 600 cycles per minute. Principal use is for electric control of small, double-acting air cylinders. In the single solenoid model, the single valve stem, which is the only moving part, is spring returned. The second model, shown here, has two solenoids, and its single valve stem remains at either end of its short stroke until the other solenoid is momentarily energized to return it. This feature makes "momentary contact" operation possible, eliminating the necessity of keeping the solenoid energized as long as it is desired to hold the valve in its shifted position. Pipe or tubing connections are to a separate "manifold," to which the valve mounts.

For More Details Circle No. 41—Page 217

Steel Beam Trammels: Lufkin Rule Co., Saginaw, Mich.—Steel beam trammels are designed to produce an accurate and easy-to-use tool for layout work, scribing and measuring. Freely turning knurled grips on top of



each tram make the tool easy to use. Once set trams will not turn because the top of the rigid beam is flattened. Spring friction prevents the trams from sliding off the beam when the clamping nuts are loosened. Scriber points are hardened for long-wear. A fine-thread adjusting screw gives accurate and fine adjustment of the points. The beams are 10½, 14½ and 20 in. long. With the 20-in. extension beam, circles up to 72 in. in diam can be scribed with the 20-

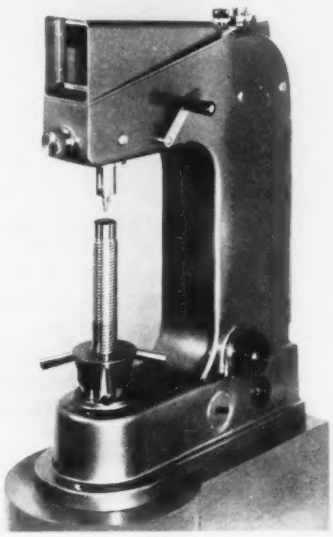
in. trammel. Also available are needle point, steel point and lead holding chuck and pen and ball point attachments.

For More Details Circle No. 42—Page 217

Pipe Wrenches: Capewell Mfg. Co., 60 Governor, Hartford, Conn.—Pipe wrenches offered in sizes ranging from 6 to 48 in. long feature a double-action spring which assures instant grip and release. On removal of hook jaw, the spring stays in the handle and will not fall out, although it can be snapped out easily for cleaning or replacement. Hook and heel jaws are made from a special analysis steel.

For More Details Circle No. 43—Page 217

Hardness Testers: Oppelm Co., 352 Fourth Ave., New York 10—Hand operated metal hardness testers

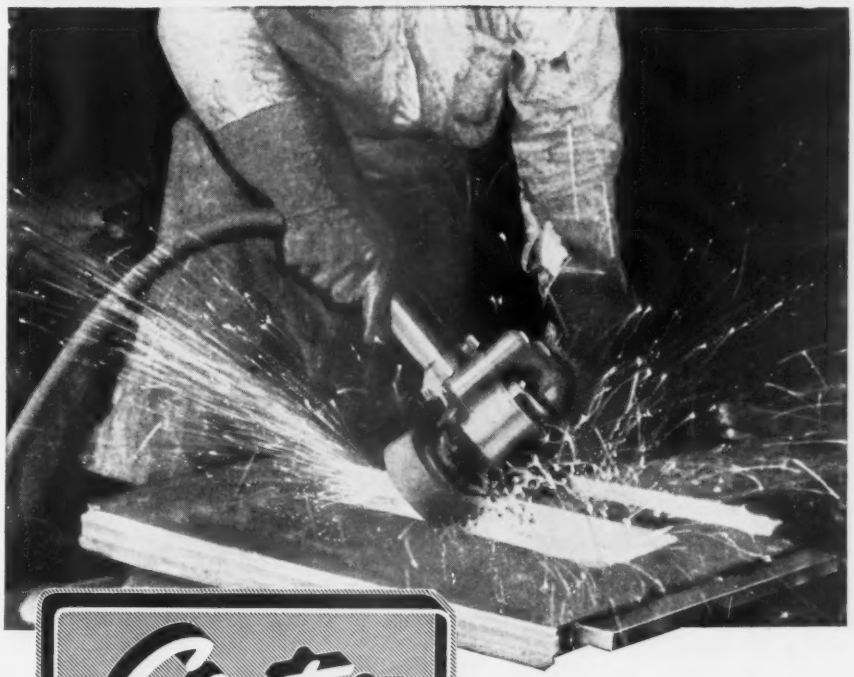


provide automatic load changing and magnified optical readings. Made by the Galileo organization, of Italy, they are a superficial tester that provides loads starting at 5 kg and a standard tester which handles Rockwell measurements from 30 to 1000 brinell units, brinell tests, special loads and Vickers measurements. Turning a dial switches loads in the interior of the instrument. Speed of load application is regulated by a built-in oil damper with an external control. Testers can accept samples up to 7½-in. thick. Highly magnified scales are projected onto screens at the tops of the instruments.

For More Details Circle No. 44—Page 217

Ferrochromium Alloy: Vanadium Corp. of America, 420 Lexington Ave., New York 17—Ferrochromium produced in two grades, 0.025 and 0.06 per cent C maximum, features high density, low silicon content, exceptional cleanliness and a

SPECIFIC PURPOSE



Electro TRADE-MARK SINCE 1919

Portable air grinders, fitted with Electro type 11 Flaring Cup 6" resin Grinding Wheels, are used to finish armor steel castings, at Riverside Foundry, Bettendorf, Iowa.

GRINDING WHEELS RESIN VITRIFIED

"Improve the grinding operation, if you want to merit the wheel business." That's what our people hear day after day. And we like it! Because that's how "Specific Purpose" grinding wheels do get a chance to prove their high merit.

A job-side grinding wheel survey in your plant by one of our technical experts ought quickly to reveal whether Electro Wheels can serve you better and/or faster. (It's our responsibility.)

If you too, like this way of doing business, you are cordially invited to write us, to make a grinding wheel survey at your job-side.

(No cost or obligation to you, of course.)

Electro Refractories & Abrasives Corporation • 344 Delaware Ave., Buffalo 2, N. Y. • *Manufacturing Plants*: Buffalo, Electric Furnace Division, Cap-de-La-Madeleine, P. Q., Canada Regional Warehouse: Los Angeles 58, California • Grant S Diamond, President • *Products*: Grinding Wheels • Crucibles Refractories • Electrocarb Grain • Electrocarb Briquets

R-448

Electro Refractories & Abrasives Corporation

high chromium to carbon ratio. Also available are two new blocking grades of ferrosilicon with nominal silicon contents of 25 and 50 per cent. The 0.025 per cent C maximum ferrochromium is for use in extra low carbon grades of stainless steel, the 0.06 per cent C maximum for use in higher carbon types of stainless.

For More Details Circle No. 45—Page 217

Flooring Compound: Monroe Co., 10703 Quebec Ave., Cleveland 6 —Improvement in flooring compound is reported to enable it to withstand loads up to 20 tons. Now formulated with newly available granular plastic resins and nonstone aggregates, it assertedly produces a hard, smooth, resilient floor on which heavy hand trucks and trucks with narrow steel wheels roll easily. It can be used to patch or resurface concrete, indoors or out, and is especially recommended for loading platforms and aisles subjected to extra heavy traffic. Requiring no special skill for application, the product is ready for use 4 to 6 hr after installation.

For More Details Circle No. 46—Page 217

Cut Core Baking Time by

1/3

With

MABCO Core-Oil Accelerator

Absorption of oxygen and molecular rearrangement have heretofor been the slowest segment of the core baking process. But now MABCO Core-Oil Accelerator added to your core sand mixture forces the core oil to accept oxygen faster and at a lower temperature.

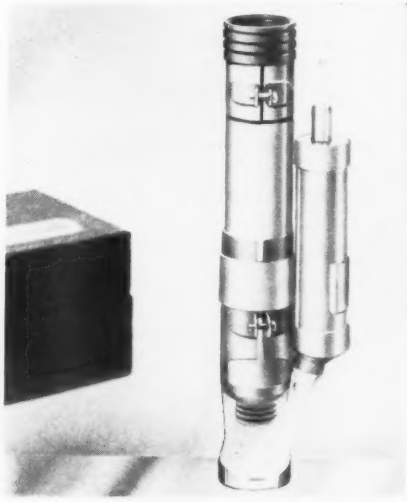
Here is what this means to you - -

- Speeds up oxidation
- Cuts thorough baking time by 30 to 40 per cent
- Increases uniformity in large cores
- Eliminates many second trips through oven where continuous baking equipment is used
- Has little or no effect on green properties of mixture
- Increases dry peak tensil strength of many oils

Write today for Bulletin CA251 and find out how MABCO Core-Oil Accelerator can save you time and money.

M. A. BELL COMPANY
217 Lombard St. · St. Louis, Mo.
"Serving the foundry industry for over 25 years"
HOUSTON DENVER

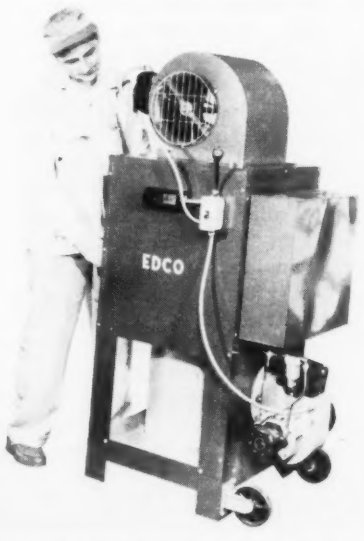
Brinell Microscope: Pacific Transducer Corp., 11921 West Pico Blvd., Los Angeles 64—Low-cost brinell microscope-reader features a reticle in a flat-field optical system and a self-enclosed concentrated beam of light. It assertedly provides a clear image of the indentation made by any brinell type hardness tester with the sharp image of the reticle superimposed. Scale is calibrated in millimeters and tenths of millimeters



and is 7.0 mm long. Field diameter of the microscope is 7.5 mm. Unit magnifies to 20 diam. It also can be used wherever a microscope is needed to make other flat measurements with the range of 7.0 mm and for all other shop and laboratory uses requiring medium magnification.

For More Details Circle No. 47—Page 217

Oil-Fired Heater: Cauhorn Distributing Co., 9999 Broadstreet, Detroit 4— Portable oil-fired heater is



self-contained and can be rolled on its own wheels by one man. It operates on kerosene or on No. 1 fuel oil and produces up to 190,000 Btu

(*Concluded on page* 234)

Eye Protection

GOGGLES LIKE THESE

are cutting Eye Accident Costs in Gray Iron . . . Malleable Iron . . . Non-Ferrous and Steel Foundries

Foundries differ in the frequency and severity rates of eye accidents, but all these injuries can be costly. That's why AO developed the 305-50 NFA Foundry Goggle. Year after year it has proved itself against impact hazards in foundry work such as melting, pouring, chipping, grinding, babbitting, riveting, hand tool and machine operations. Your nearest AO Safety Products Representative can supply you.

QUICK FACTS

MASK — Soft, snug-fitting plastic with nasal edges of soft sponge rubber bound with pliable corduroy. Very comfortable.

VENTILATORS — Wire screen around eyecups provides plenty of ventilation and helps control lens fogging while blocking off sparks and flying matter.

HEADBAND — One-piece, rubber, easily adjustable.

LENSES — 50 mm. Super Armorplate or 6-Curve Super Armorplate, clear or Calobar. Medium, dark, or extra dark.

SIZES — Model 305-50 is standard for large or medium faces; "307" is for smaller features. For heavy dust protection, ask for "306" for large or medium faces or "308" for smaller faces.

American Optical
SAFETY PRODUCTS DIVISION

AO SAFETY ZONE

Keep your workers in the Safety Zone with AO Safety Equipment

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

(*Concluded from page* 232)

of heat per hour. No installation vent, flue or chimney is required. All that is necessary is a 110-115-v, alternating current outlet. A blower on top of the heater draws in air and forces it down and over a heat exchanger; from there it is blown out through openings in three of the lower sides. The heated air is circulated directly to the feet, legs and body zone of the work area.

For More Details Circle No. 48—Page 217

Fork Truck Dumper: Automatic Transportation Co., 149 West 87th St., Chicago 20—Rotary dumping mechanism slips readily onto the forks of the firm's electric industrial truck shown here, converting the truck from fork operation to dumping operation in less than 20 minutes. Dumping action permits forward rotation of 190 degrees by using hydraulically actuated pinion gear arrangement. The truck's permanently attached forks are hydraulically adjustable, facilitating clamping action.

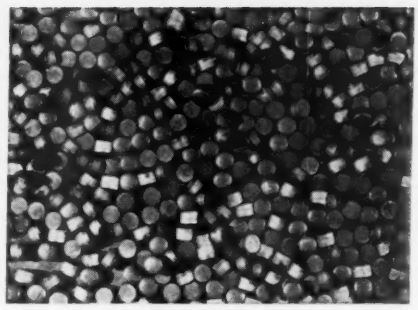
For More Details Circle No. 49—Page 217

Fire Protection: E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33—Company is offering a "safety package" of processing products that are safe to use in the vicinity of fire and intense heat. They consist of a noninflammable hydraulic fluid which will neither burn nor explode; a rust preventive with a high flash point; a water solution which cleans at room temperature; and an all-purpose water soluble cutting base.

For More Details Circle No. 50—Page 217

Shot and Grit: Steel Shot Corp., Newark Ave. & Market St., Kenilworth, N. J.—Steel shot and grit produced by cold forming method is said to possess uniform hardness, great density and long life. For use in metal blasting, cleaning, peening, tumbling, cutting and abrading, it is available in all commercial sizes.

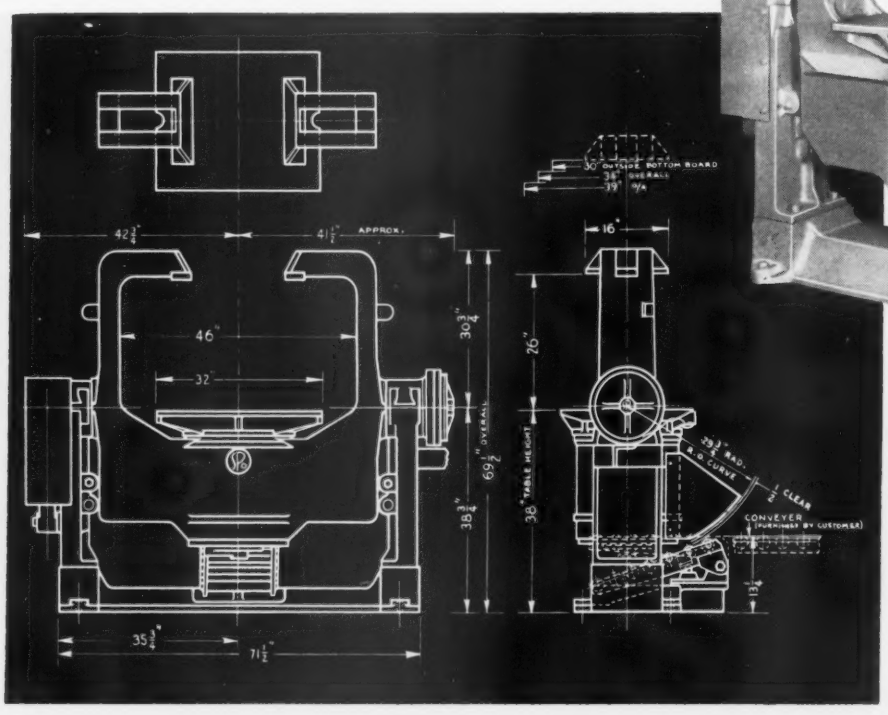
For More Details Circle No. 51—Page 217

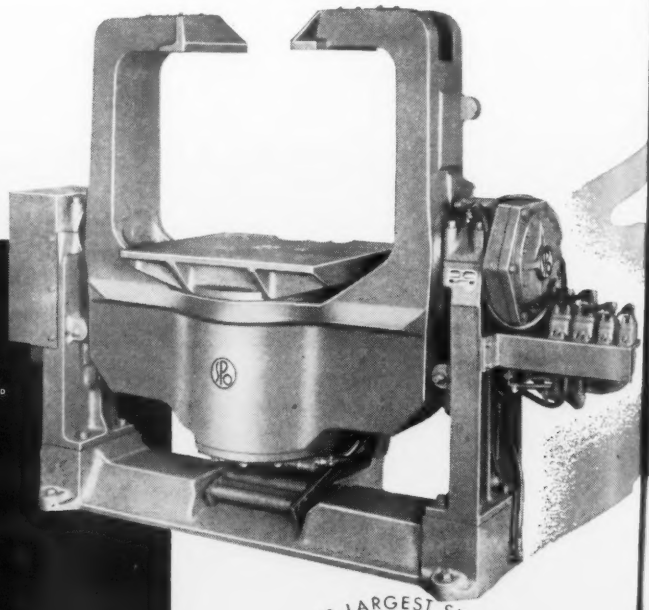


Conveyor Curve: Harry J. Ferguson Co., West Ave., Jenkintown, Pa.—Power driven roller curve is said to maintain uniform rate of flow for conveyor lines and to eliminate slowups, jamming and stoppage. Available in 90 and 180 degrees, the curve uses 2-in. diam rollers set in 5½ x 10 in. formed steel channels, on either 4 or 6-in. centers. Width between channels can be from 10 to 30 in., in 2-in. increments. Drive is a ⅓-hp, 115/230-v, 60-cycle, single phase, reversible motor with reducer.

For More Details Circle No. 52—Page 217

Capable of handling a wide range of flask sizes, Model 9546 has a 1000-lb. jolt and 14,500-lb. squeeze on 80 p.s.i. line pressure. Table size is 26x32" and rollover curve radius is 29¾". Machine stands 69½" high overall.





WORLD'S LARGEST SUPPLIERS SPO OF MOLDING MACHINES

Sand Castings

(*Continued from page* 97)

producing thin wall castings with better-than-average metal values. The company's technique in this respect is generally a departure from conventional methods. The idea is to bring metal into the mold in such a manner as to "bring it home and let it die." This goal is achieved in various ways, ranging from a series of radial horn gates to continuous peripheral gating around the mold cavity. To prevent warpage and casting distortion, the mold is gated in such a manner as to bring about progressive solidification of the fluid metal. In this manner, no internal and residual stresses are set up, and the part comes out of the sand true.

Precision castings cannot be made without precision pattern equipment. Most of the patterns are made by firms which have demonstrated their ability to meet exacting requirements. The remarks of one of these patternmakers give an interesting slant on the process.

"There are no tricks used in the patterns we make for Osbrink. They are practically the same as we would build for any other customer and differ only in the care with which they are made. Closer dimensions are specified, and they pay for better workmanship. Their precision casting is obtained through better controls, thoroughly developed techniques, and the use of workmen who take pride in doing nothing but their best on every job. Other foundries fail to obtain the same results because they will not go to the same extremes Osbrink does to obtain a 100 per cent perfect job."

Patterns with almost polished surfaces are designed to eliminate the human element as much as possible. The entire equipment setup from flask to corebox is functionally engineered, designed to expedite production with a minimum chance for human error in the foundry. Care is taken in the design to have all dimensions in close relationship to each other cast entirely in either the cope side of the mold or in the drag side.

Coreboxes have identifying recesses on the parting line which, when obliterated by strike-off, indicate that corebox is out of tolerance. All pattern equipment, coreboxes, fixtures and jigs used for precision cast parts are painted red to signify care in handling. All precision patterns and coreboxes are metal. Patterns are designed to be carefully matched to the flasks so that the required tolerances will be preserved when the final mold is assembled.

Flask equipment is of their own design, built to give minimum deflection when fully rammed. Truss construction is used to eliminate weight, yet retain maximum rigidity. Much consideration is given in design and construction of all equipment to produce perfectly mating flasks and boards.

This foundry specializes in aircraft parts. Since cast parts for airplanes generally are not very big, there is no need for equipment designed for heavy work or for long production runs. Heavy equipment which might produce vibration and disturb the assembly of a precision mold is avoided. Small parts may be run in a squeezer, but most molds are hand-rammed.

All molds are of green sand, and standard mixtures are used. Natural clay is used for aluminum castings, and synthetic bonded sand for magnesium. Extreme care is taken in housekeeping and in sand prepara-

800 drag molds per day

. . . WITH THE SPO MODEL 9546 JOLT-SQUEEZE CLAMP-ROLLOVER-DRAW MACHINE

Engineered for fast . . . safe . . . low-cost production molding, Model 9546 is a "money maker" in any foundry. The SPO design and construction features incorporated in this unit assure continual operation at peak capacity with minimum maintenance cost and down-time.

Features of this SPO molding machine include an adjustable two-speed draw . . . the patented SPO "inverted jolt" mechanism . . . an integrally mounted draw vibrator . . . the SPO valveless jolt control, which is variable from a light tap to a heavy blow . . . and air-operated rollover, brake and roll-out conveyor. For ease and simplicity of operation, the complete molding cycle is controlled by three finger-tip valves.

Model 9546 is furnished complete with necessary operating valves, lubrication fittings and vibrator. It requires only attachment of air supply line to begin economical production of uniform standard drags.

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tion. Each day various sand heaps are checked in the laboratory for proper inhibitor content, green strength and permeability. Moisture content is carefully established each night before the sand is reconditioned.

Cores for precision castings requiring internal surfaces of 100 microinch finish require care in preparation and baking. Fine mesh sand is used, and a number of cores are coated with a wash. Many of the cores are being cured in a dielectric oven, and plans are being considered to install a second dielectric unit, specially constructed to the foundry's particular specifications.

All cores are given a careful visual inspection, and critical cores are checked with special fixtures. Core placement is often checked by means of a core locating fixture or jig.

Prior to pouring, many molds and cores receive a carbon coating by being smoked with a carbon-producing flame. Another device sometimes is employed when metal is poured. Baked, hard, tapered ring cores placed in the risers are rammed up in the molds. The ring cores are filled with close-fitting tapered plugs which have handles for quick removal. When molten metal reaches the plugs, they are pulled, and the molten metal is allowed to fill the riser. Momentarily plugging the risers builds up a back pressure in the mold which enables thin sections to fill properly.

Melting is done in small, 120-lb crucibles. Use of small crucibles results in closer temperature control, as well as in greater facility in pouring. Magnesium receives a special treatment for grain control.

Test bars are not made at each pouring, but at intervals during the day. About twenty test bar molds are poured each day, at the same time test slugs for chemical analysis are poured.

Castings are visually inspected by floor inspectors before gates and runners are cut off, during cleanup and after heat treating. Heat treating is done in seven high-velocity-air electric furnaces. Castings are either carefully stacked or placed on supports. Aging is done in two low-temperature ovens. During the inspection following heat treating, each part is carefully checked. Depending on the type of inspection needed, the check is made visually, with instruments or in special fixtures. Zyglo inspection is employed on certain castings which are highly stressed in service, even though the customer may not require this service.

Special pains are taken in producing castings many foundry men say are uncastable. And special pains are taken to see that the castings are not damaged by careless handling. Racks are used to hold castings susceptible to damage, and many castings are individually packaged in cartons to assure delivery in perfect condition. These precautions are examples of the particular care the organization uses to see that the customer gets a precision casting ready for use with a minimum amount of machining.

Call it what you may—a procedure, a normal operation, or the Osbrink Process—the results speak for themselves.

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American Scale Co., Kansas City, Mo., has been purchased by Cromb & Gagel Inc., 2000 Walnut St., Kansas City, Mo., and will become its American Scale Co. division. The acquisition includes physical assets and inventory of the firm's Pleasant Hill, Mo., plant and foundry and its trade name and products.

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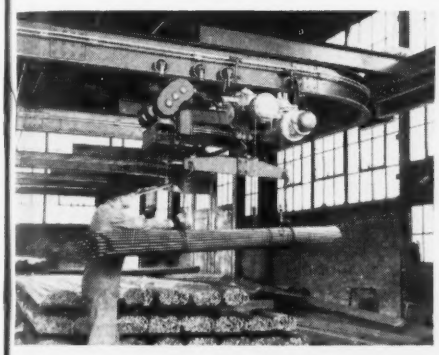

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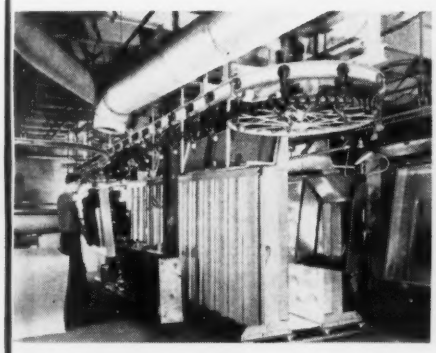

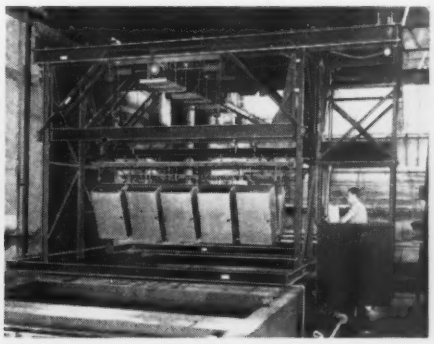

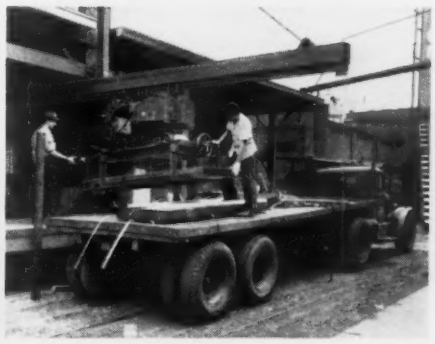

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Industrial Engineer

(*Continued from page* 99)

of all, for putting the good ones into use.

A little bit about the training of industrial engineers. We have a training program, as I imagine most other foundries of any size have, that calls for college graduates to come in and spend a year to 18 months going through the shop in various departments, preparing themselves for jobs in the foundry itself or in sales and other departments of the company. Industrial engineers go through this same training along with other engineers, and make no distinction, at least at first, between the industrial engineers, economics graduates, mechanical engineers, metallurgists or anyone else.

The important part about this training of industrial engineers is that they do not enter our industrial engineering group until they have spent probably a year working in other departments. They are trained in the shop, and that is where they get the background that makes their work effective after they start working on industrial engineering projects.

Work Handled—Let me discuss a little the type of projects we handle and the way we handle them. Because the field of industrial engineering has not been very well defined, there are so many different ideas about what it encompasses. Our industrial engineers probably spend more time on plant layout than on any other special projects. This is because we now are in a period of plant expansion.

Second to that is the old problem that we all have of materials handling. We are constantly investigating new equipment and seeking ways to utilize better what we have. Other projects we spend a lot of time on include methods engineering and all that might encompass—motion study, workplace layout, machinery design and modification of machines to conform with the principles of motion economy and methods time measurement, a new tool that has been developed by industrial engineers for use in all industries.

We make cost analyses of all kinds, whether a project is to be handled entirely by the industrial engineering department or whether other departments bring problems to us for analysis of old costs and estimates of future ones.

We often work on equipment surveys to determine how much more use we can get out of old equipment or how much benefit we can get from

new equipment. Production planning is a field we are just getting into. As a mechanized job shop, the company is in great need of some organized approach to that problem.

We are constantly involved in jig and fixture design to make work easier for people who work with their hands, to cut down on fatigue, to simplify and to do the work more economically. Lately we even have taken some flyers into office procedure analysis. Now maybe that is on the extreme edge of industrial engineering, but there is a great need for it; and since there is no one else to handle it in our plant, we have done some work along those lines.

The general procedure for handling any of these projects, whether they are assigned from above or are problems submitted by the shop, is more or less the same. It is a standard procedure for attacking almost any problem.

Tap All Available Sources

First, a definition of the problem is necessary. Just what is it we are trying to find out? After that, the job becomes a process of fact finding. What causes the problem to exist? This procedure means gathering information from everyone who may be able to supply it—the people who do the job, the people who sell the equipment to do the job, other departments, other engineers. No available source must be overlooked.

Then it is a matter of establishing all the possible solutions, and here again the ideas of others who are concerned with the project often are helpful. Next a decision must be made as to which is the best solution. This may be accomplished by the engineer alone, but most of the time it requires a group decision. Then completion of the project usually is in the form of a report submitted by the engineer to those who are concerned with the solution to the problem. It may also include the supervision of the equipment installation or of whatever change is finally approved.

One thing that is most important to industrial engineers—important to all engineers, but I believe more important to industrials—is co-operation and liaison with other departments in the plant. We try to emphasize that in the training we give. The effectiveness of any industrial engineer's work is dependent upon the degree of co-operation and communication he has with other people in the plant, especially department heads and other staff personnel. He cannot work without that co-operation. It requires a great deal of mu-

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tual understanding, trust and faith, and if that is not present, the industrial engineer is up against a difficult problem. Let us consider, for instance, our co-operation with other engineers and how it works.

We have an engineering design group. Let us call them design engineers for the purpose of this example. On numerous occasions we have to sit down with them when we are working on problems. It is up to the industrial engineer to make a rough sketch of what he thinks would be proper. This would come after an economic analysis has been made by an industrial engineer of how relocation of machinery could influence production and make it more economical.

Then, working with the industrial engineer, the design engineer is the one who actually makes the detailed plan and works with the details of the building construction and machinery installation. The kind of co-operation which would be necessary is obvious.

The materials handling problem is little different. The industrial engineer would select the piece of equipment he thinks is proper after making an economic analysis to decide whether it can be justified. Then the engineering department would check the selection with regard to power consumption, weight and space limitations, maintenance problems and so forth. Co-operation again is essential. We do not have to set up arrangements in any definite way. We don't try to draw the line definitely between these two. With proper co-operation, it is not necessary.

We require co-operation with time study and cost departments constantly. On almost any new project or change, the industrial engineer must go to the time study records to find the previous operating costs or estimates of future costs. Sometimes special time studies must be made to supply cost information not already available.

Co-operation with the metallurgical department is necessary on many problems. One that comes to mind is the problem of coke handling. Being concerned about the cost of handling coke, we have proposed several different systems to get the coke from cars into our bins. The metallurgical department, however, is concerned about coke breakage, and so far we have not been able to find a solution that will give us low cost as well as low coke breakage.

All operating departments are encouraged to use our industrial engineers. The only way we feel that an industrial engineer can be effective in helping our operating departments and our individual department heads is for him to be intimately familiar with what goes on in their departments. That is why, in our training, we start our industrial engineers out in the shop, where they get to know the people, the problems, the types of jobs going through and the proposed changes that are going to be made in the shops.

They have to start at that level because there is no such thing as sitting at a desk in an industrial engineering department and being able to help actively and to participate in solving the problems that occur in the shop. That is why an industrial engineer must spend considerable time talking with supervisors and keeping himself up-to-date on their problems. Only in that way can he anticipate problems and work with the individual supervisors in finding the solutions.

One can see what kind of disposition and what kind of approach that takes, but that is the way it has to be to make the relationship effective.

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Familiarity breeds success in this case, and it is the industrial engineer's responsibility to develop and maintain the proper kind of familiarity.

A brief description of some of the jobs we have completed will give an idea of the scope of our industrial engineering group. One of our largest jobs, completed a few months ago, was a relayout and redesign of our production coreroom. Industrial engineers were responsible for the development and design of a new green sand handling system. They also designed a system of conveyors to handle baked cores through the cleaning, assembly, blacking and drying operations.

In our cleaning department we have worked out an orderly workplace layout for chippers and grinders by making racks to hold their tools and standardizing the tables they use and the amount of space in which they work.

We are engaged in an extensive palletizing program in all stages of the handling of the castings and raw materials.

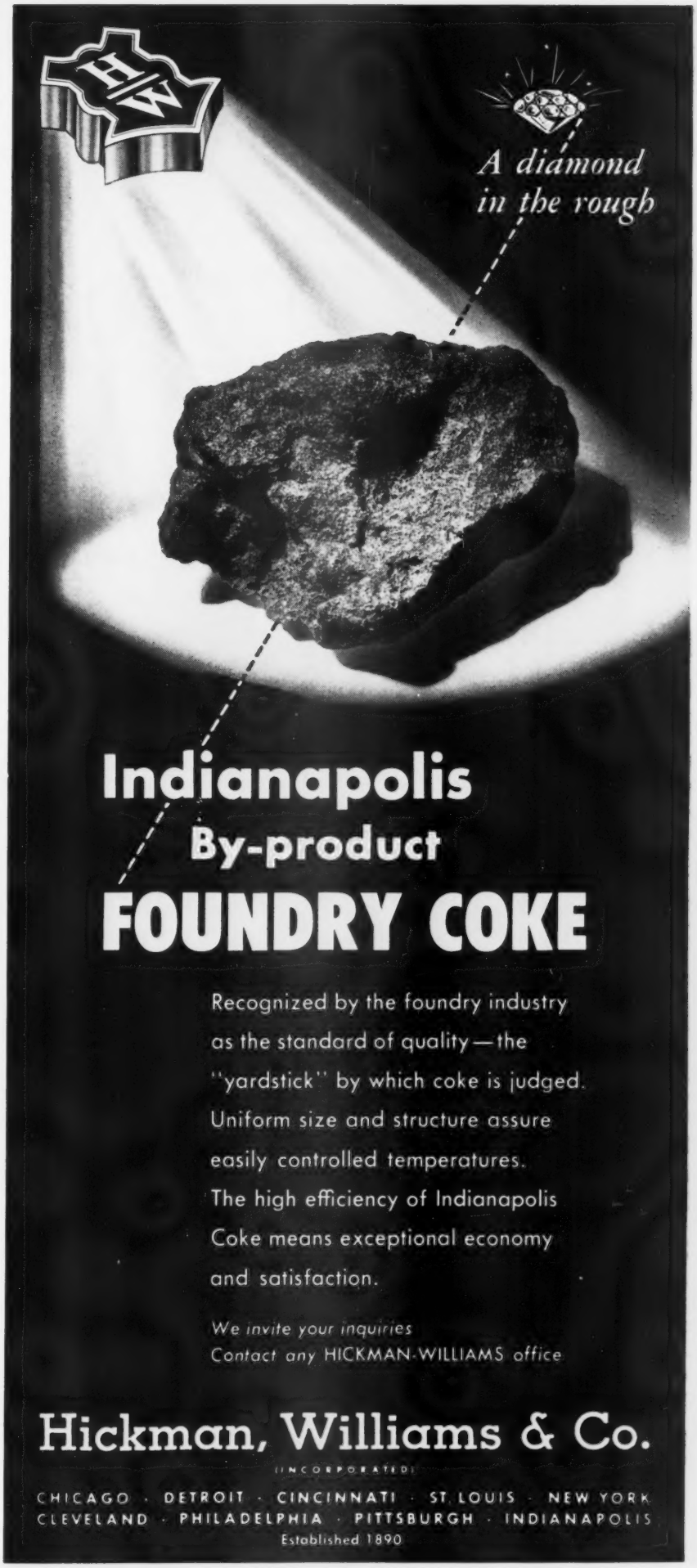
New Departmental Layout

We have just completed a machine shop relayout. We are not in the machine shop business except for a few castings on which we do the rough machining, but we found it was necessary to separate all repair and maintenance work from the production machining. This required a completely new departmental layout in the plant.

We make a transmission casting weighing about a ton and a half, and for years we were unable to devise any method of getting it into a shipping car except by using a large railroad crane to load it into the open end of a boxcar, an unsafe and costly practice. Recently we were able to justify the purchase of a fork lift truck and the construction of a ramp for loading these transmission cases. Savings offset the cost in about three months.

We have been concerned with the design of workplaces for coremakers and we have done a lot of research to develop the best height and shape of bench and the best method of delivering sand to the coremaker. Now we feel we have something that is very effective and helps to ease worker fatigue.

We are engaged in some experimental work with shell molding and have plans for more extensive work. Industrial engineers are sitting in on discussions concerning the space, the number of pieces of equipment, and the number of men that will be required to operate this unit.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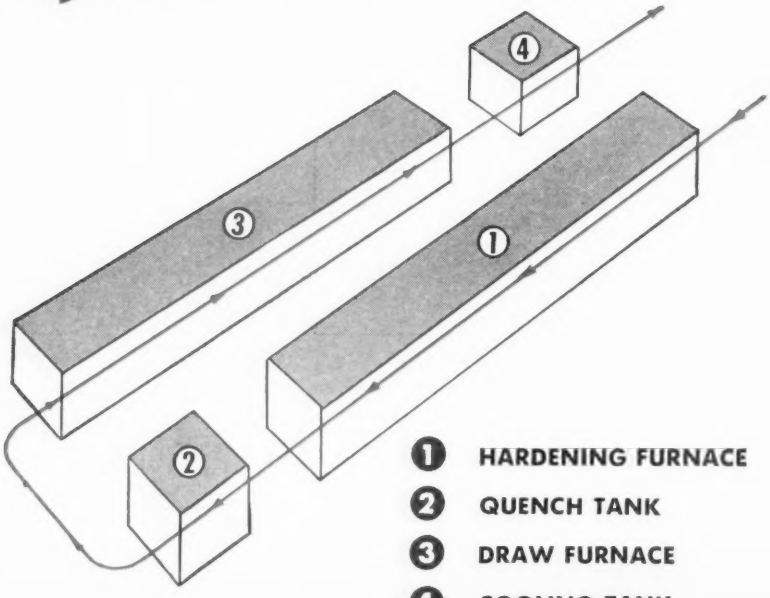

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Drawing a definite line between industrial engineers and other engineers — mechanical, metallurgical, electrical—whatever you have in the foundry—is difficult. It is an unlimited field as far as we are concerned. It grows every day. We feel an industrial engineer can do better if he is not limited. So with us he is certainly one of those persons who is always sticking his nose into something, and so far he has gotten along all right. If we can develop the right attitude on the part of the industrial engineer, he can do it and get by with it and get results from it.

No matter what our branch of engineering is, we all are concerned with making a better product at a lower cost. That is our common ground. The industrial engineer strives to reach this goal along with other engineers, but the factors he deals with are not as absolute as those of his colleagues. He finds that instead of machinery and equipment and buildings, he is dealing with how people operate and use them. Instead of the materials, the actual composition of the iron and sand and fuel, he is concerned more with getting those materials to and from the point of use. What does this imply? It implies that instead of things, industrial engineers find that they are more concerned with the people that use those things.

Three Classes of Engineers

Now in a very general way, I wonder if we cannot make this parallel. Everyone has heard of the three M's of manufacturing, the three factors which enter into any manufacturing operation. There are Materials, Machinery and Men. Don't misunderstand me. I am speaking in a very general way and there are always exceptions to these broad generalizations. But would it be possible to make this parallel? Metallurgical engineers deal with the materials; mechanical engineers deal with the machinery; and industrial engineers deal with the man—with how they do their day's work and how they use their materials and machines.

Industrial engineering has come a long way since the days of the efficiency expert. In those days there was a definition for industrial engineers. He was the man who knew less about your business than you did but who got paid more for telling you how to run it than you could make by doing it the right way instead of the way he told you. That was some time ago, and I believe a lot of progress has been made since

then. We need a new definition.

It is our feeling that the reason for this progress and for the improvement in the reputation of the industrial engineer has been the realization of the importance of the man on the job, that jobs are men and are not to be dealt with as machinery. That is something that more people are beginning to realize all of the time. I believe that is the way that industrial engineering will continue to be more effective in the foundry industry, and in all others, too.

Mechanical Engineer

(*Continued from page* 99)

maker ever knew why a certain amount of horse manure mixed with his sand prevented the core from scabbing. Would you blame him for not wanting to tell all of his hard-earned secrets to some young squirt who probably at first impressed the self-educated coremaker as a know-it-all with newfangled notions!

Foundry workmen no longer have this attitude toward engineers, for the engineer has demonstrated by developing better materials and equipment that he can make the job of the workman much easier and less of a pure art. Recently the same workman who twenty years ago was surprised that I looked like a college graduate, expressed his appreciation for the mechanical improvements that had been made by the engineers. He had become aware that these improvements enabled him, when he was no longer in his physical prime, to do with a minimum of physical effort, the work for which he had been trained.

The engineer has developed molding sands to the point where five years of molding experience are no longer required to make a good mold. The engineer has determined why the old coremaker had to use horse manure mixed with his core sand, and has developed a more sanitary substitute. In fact, the engineer has won his spurs both with workmen and with management. The workman now respects him because he has demonstrated repeatedly that the intelligent use of basic scientific information can simplify and facilitate the work that must be done. Management respects him because he has assisted these executives in operating at a profit even in very lean times.

Up to this point we have used the term "engineer" in a broad sense. Exactly what kind of an engineer is a foundry engineer? We think of the foundry as a metallurgical industry, because it makes, shapes and treats

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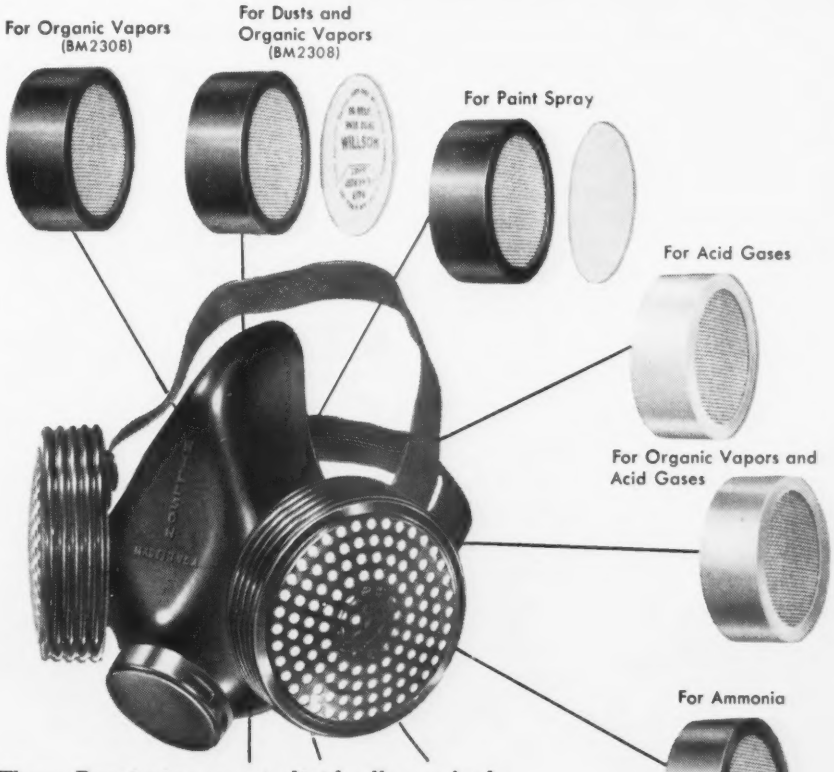
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metals. Naturally the industry is interested in obtaining engineers with metallurgical training because if we are to produce good castings, we must first make the right kind of metal and deliver it to the foundry. After the casting is made, we must heat treat it to develop desired properties.

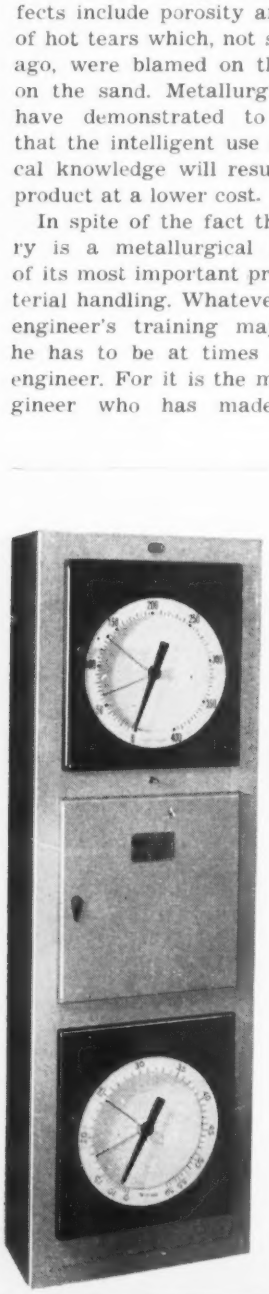
Thousands of tons of castings have gone into the scrap pile because of poor metallurgical practices, but the metallurgists are rapidly improving melting techniques. They have won their spurs because, in addition to making many other improvements, they have determined the real cause of certain casting defects. These defects include porosity and some types of hot tears which, not so many years ago, were blamed on the molders or on the sand. Metallurgical engineers have demonstrated to management that the intelligent use of metallurgical knowledge will result in a better product at a lower cost.

In spite of the fact that the foundry is a metallurgical industry, one of its most important problems is material handling. Whatever the foundry engineer's training may have been, he has to be at times a mechanical engineer. For it is the mechanical engineer who has made spectacular improvements in the operations of the foundry industry, improvements which have resulted in a reduction in labor costs from as much as 125 man-hours per ton of castings shipped to 50 man-hours. It is no wonder that a mechanical engineer can have a field day in an industry where it is necessary to handle between 70 and 100 tons of material to ship one ton of castings.

Moreover, the intelligent applications of the principles of mechanical engineering will continue to show startling improvements in the foundry. Even today, after many improvements have been made, the handling of various materials is so appallingly inefficient that in many foundries such a simple item as a core may be handled seven or eight times before it is finally placed in the mold. The development of automatic machines for molding, coremaking, and grinding has just been started. Thousands of men are still employed to remove metal with a pneumatic chipping hammer. Foundries continue to perform many operations in the same manner, except for minor changes, in which they were performed thirty years ago. There are undoubtedly better ways of doing these things, and the engineer trained in mechanics will find these better ways.

The foundry engineer, in addition to developing better metallurgical practices and designing more efficient machines and equipment, will be called on to improve the quality of many materials which are of basic importance to the production of good castings. One of these basic materials is molding sand. Molding sands have been developed to the point where the services of a skilled molder are no longer required to make a reasonably good mold. Yet, many properties of this important material are, to say the least, poorly understood.

Why should the steel foundry molder still be required to use scab nails to keep the sand on the cope face of his mold in place? Why does the molten metal penetrate the sand? How can we obtain such high hot strengths that the sand will not erode, yet be sure that the sand will collapse at the proper time? These are just a few of the problems involving molding sand which will be solved by men trained to use scientific facts as a basis for constructive thinking. Such men should be able to develop new core binders, new refractories and other materials which



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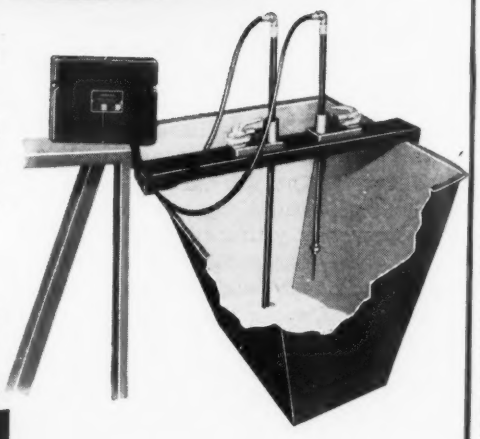

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will make the production of castings more of a science and less of an art.

Even in this day of efficient scientific control, far too many important items in the production of castings still remain a matter of past experience, of cut-and-try, or, let us say, in the field of art rather than that of science. The foundry engineer, in designing the gating system for any casting, must use some method of determining the effect of fluid flow—ferrodraulics, if we may coin a word. The science of hydraulics is well developed, but do we know how much of this science we can apply to a material with seven times the mass of water and with a viscosity which varies with relatively small temperature changes?

We know that at least one of the laws of hydraulics seems to apply in the case of molten metal. The proper understanding of the law which states that the carrying power of a liquid varies as the cube of its velocity has helped the foundryman to produce cleaner castings. Research projects are in progress which will undoubtedly throw more light on this subject, so that the foundry engineer who can apply the facts brought out by these projects will be able to show the industry how to produce better castings at a lower cost.

How To Control Solidification

The art of feeding castings will become a science if the foundry engineer is trained to use the data now coming out of the research laboratories. Now that the x-ray and betatron are common tools for determining the solidity of castings, the industry must be able to determine intelligently how to control solidification and thus how to feed intricate castings. The problem is one of heat transfer, and the foundry engineer who understands the principles which govern the flow of heat within a body of metal as well as the transfer of heat from one material to another will be able to produce surprisingly good results. The feeding of large steel castings has been for years a "by guess and by God" proposition.

Recently a young engineer was hired by a foundry which produces high-pressure castings. The first assignment of this young man was to study thoroughly all of the literature dealing with the solidification of steel. Then he was given the job of designing the feeding of a 7500-pound pressure casting. The foundry had previously produced one of these castings, only to have it rejected because the x-ray disclosed a lack of solidity. The second casting, which was made and fed in the manner suggested by this young engineer, was

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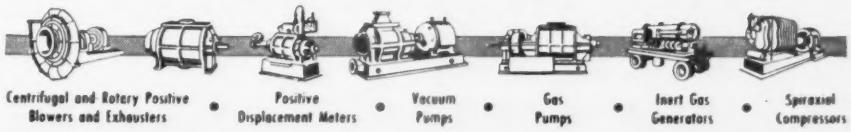

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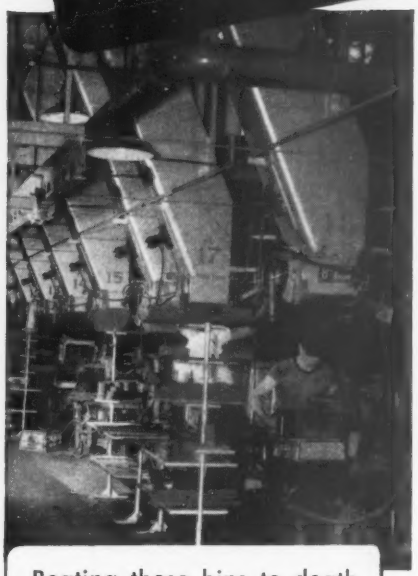

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acceptable to the customer. The young engineer had demonstrated that science is fast overtaking art in the feeding of castings.

The foundry engineer who understands industrial engineering is solving many of our problems of job analysis and production by a truly scientific approach. And, indeed, nothing is more essential to American industry than our extremely high productivity.

Not long ago an Australian foundryman who had spent several months in Europe and the United States studying foundry practices said, "The productivity of the American workman is the key to your whole economic system. If you ever lose this high production per man-hour, the United States is through as a world power and the world itself will suffer." This foreign foundryman was tremendously impressed by the fact that the high output of the American workman was not the result of high physical effort, but was the result of planning and engineering which tended to eliminate physical effort.

Engineers End Hard Work

Recently, for example, my company completed the installation of a new molding station. We had incorporated in the design of this station all of the ideas which we were sure would help to eliminate physical effort and permit workmen to attain a high production rate. One of our old employees who had been a molder many years ago asked his foreman why we had not designed molding stations that way when he was a molder. He said, "Look, those fellows don't have to do any hard work."

The foundry engineer is revolutionizing the industry in all its departments, from personnel to sales. Human engineering is just as important as sales engineering. The salesman of today must be able to talk intelligently to the designing engineer and can no longer depend solely on his personality and ability as an entertainer. Similarly, the personnel director no longer has a seemingly unlimited source of manpower to draw from. He now has the human engineering problem of putting men into jobs which will fit their likes and dislikes as well as their capabilities. He must assist management in improving working conditions.

Thanks to the engineers who have worked on ventilation, the foundries of this country are no longer the sort of shops where a man who inhaled deeply twice might get one lung full of good air; nor are they any longer the type of shops that made wives of foundry workmen find a half-inch of black sediment in the

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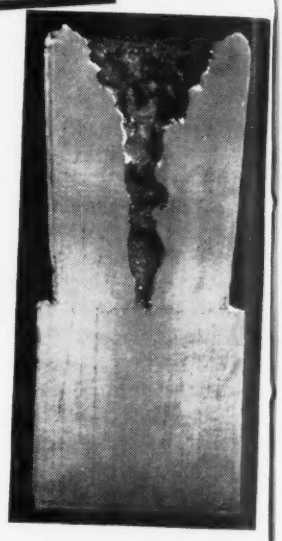

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FOSECO FEEDEX gives you a sound casting with a small residual feeding head, as shown above. To obtain a sound casting without FEEDEX, a large, metal-wasting feeding head is required — as also shown. FEEDEX is a moldable heat producing compound for automatic feeding, and promotes progressive solidification. Mix with water, mold into desired shape, bake dry, insert into mold.

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bottom of their washers after they had done their husband's work clothes.

What kind of an engineer, then, is a foundry engineer? In addition to being a physicist, is he a metallurgical, a mechanical, a ceramic or some new variety of engineer? Does his education have to include training in all of these branches of science? The answer to this question probably depends on the particular shop in which he works. Large foundries can afford men who are specialists in the various branches of engineering, whereas smaller shops cannot. Actually, which branch of engineering the man may have taken as his major makes little difference. He will be a successful foundry engineer if he has learned to think in terms of basic scientific principles.

Metallurgical Engineer

(*Continued from page* 99)

and list them as staff members in that capacity. Of course, there are exceptions to every generalization that is made, but for the most part, foundries that produce over 100 tons and upward of 750 to 1000 tons employ a metallurgist. In some cases such a metallurgist may have an assistant who is a graduate metallurgist, but usually the assistants are high school graduates who perform tests and chemical analyses and keep records under the direction of the metallurgist.

What are the duties of the metallurgist in these foundries? First of all it should be pointed out that, in the past, certain foundry managements have thought that a metallurgist should concern himself only with the metal phases of production. While the thinking on this point is changing today, it is still a point of policy that metallurgists are metal men only. The reason for this thinking should not be laid entirely to management; The metallurgical engineer certainly has been responsible for helping to establish such policies.

For example, the author discussed the role of a metallurgical engineer in a steel foundry with several metallurgical students at an FEF university a short time ago. They seemed very much disturbed to learn that a metallurgist should have other duties than those directly connected with metal.

The metallurgist in the average steel foundry should be concerned with the entire quality control of the product; and forward looking managements should make the metallurgical engineer responsible for the quality of the product subject to the policy of top management as to what

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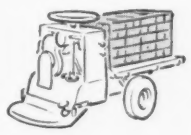

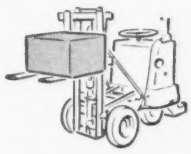

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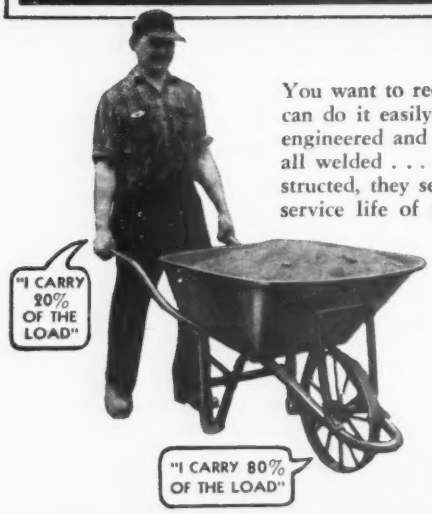

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quality means from the standpoint of their product. The metallurgist's immediate superior should have a rank equivalent to that of a vice president of either production or sales.

Responsibility for quality production in a foundry means direction over the following operations:

1. Testing of all raw materials and supplies to ascertain whether they meet purchasers' specifications and developing purchase specifications that are sensible for the type of the material required and permit a reasonable control.

2. Be an active member of the casting planning group to dimension gates and risers and plan for their location.

3. Develop melting procedures for the various metals produced.

4. Adapt and standardize tests which will indicate acceptability of melting procedures, such as for fluidity, temperature, slag control, oxygen content, metal brake tests, etc.

5. Develop chemical analysis procedures and test all metal heats.

6. Check all orders for customers' specification requirements and advise inspectors and operating departments of procedure required to meet specifications.

7. Standardize test coupons, arrange for coupons to be poured in each heat, stamp bars, machine test specimens, make tests and certify results.

8. Develop standard tests for sands and control mixtures and assist, with foundry superintendent, in the development of molding sands and core sands.

9. Arrange for control times and temperatures on core ovens. Establish temperature and time controls for core baking.

10. Check core and mold dimensions as required.

11. Inspect castings in the green.

12. Prepare and check temperature requirements for the removal of gates and risers on castings.

13. Prepare procedure for heat treatments and check time and temperature meters. Specify agitation and temperature of quenching fluid.

14. Develop procedures for welding castings, involving such factors as qualification tests, electrode type, preheat, postheat, quality of weld, etc.

15. Prepare procedures for surface inspection, pressure testing and all types of nondestructive testing. Direct the inspection and check results against customers' standards.

16. Check castings against tolerance requirements.

17. Develop the requirements of statistical quality control over as

many test operations in the foundry as possible and interest men and management in its possibilities. Work with the chief operating man to arrange their operation on a day-to-day basis.

18. Reject castings below customer requirements and established policy of the company.

It will be observed from this outline of duties that the metallurgist of a foundry is as busy as a basketful of snakes. However, he does not have to do all these jobs himself. A number of inspection jobs listed normally would require the services of inspectors. In many cases the chief inspector controls all inspection activities and reports directly to a policy officer of the company. In other cases, in the more modern trend, the chief metallurgist controls all quality requirements.

In all probability the metallurgical engineer coming from a university would hardly be in a position to direct all the activities outlined above.

If the foundry had not previously had a metallurgist, management would not think that he could take over such a large assignment. In all probability he would be limited to the metal end and could not qualify to handle the inspection activities of the foundry, even though they might be small.

Metal Control Is Not Only Duty

In many cases the metallurgist has accepted the duties of metal control and has made no effort to do anything else. The attitude is that he spent 4 or 5 years studying and that he has finished all that and refuses to devote further time to the study of the other activities possible for a metallurgist. In fact, he probably sees no particular need for his talents in the field of sands and cores, welding, inspection, nondestructive testing, and so on.

It seems that one of the advantages of the FEF courses at the various universities is that they can point out the importance of sand control, of the fundamentals of solidification of cast metals and of inspection requirements, as well as of those matters relating to the metal itself.

The FEF courses give a basic understanding of these foundry problems, and the metallurgist who takes these courses should soon learn that these related phases of control of the foundry product are as important as those related to metal control, and perhaps more so. It is hoped that these enlightened metallurgical engineers will realize the quality requirements of a fully controlled product and will continue their studies

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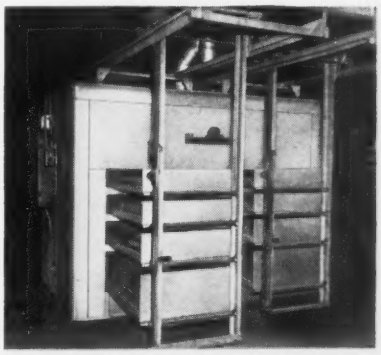

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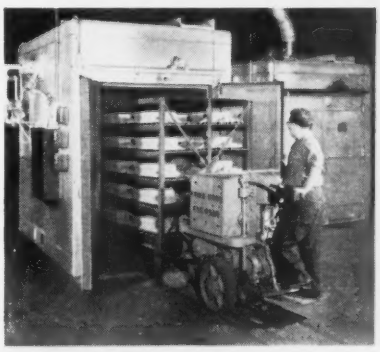

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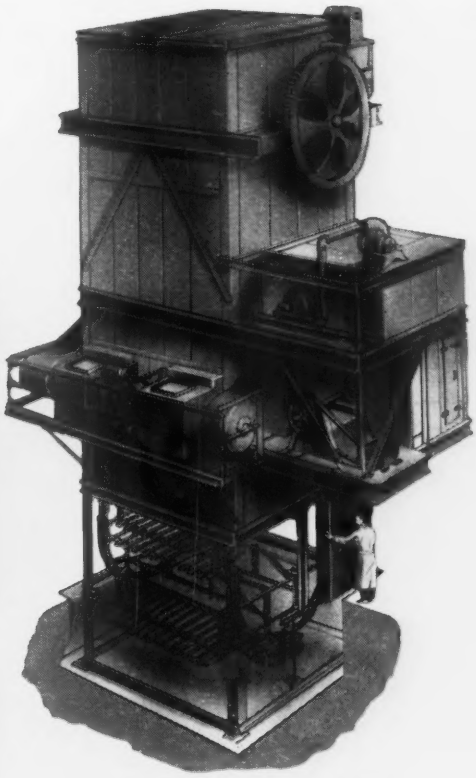

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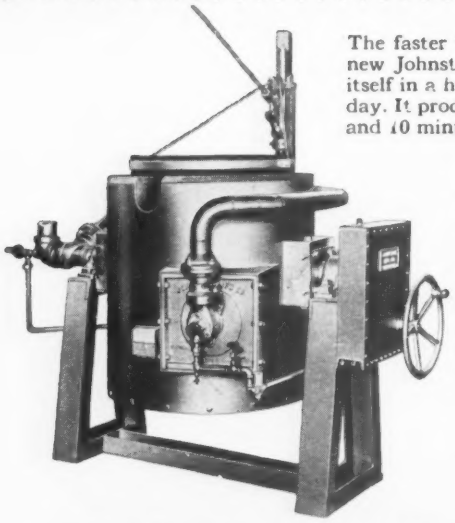

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A new enclosed tilting mechanism makes tilting easier than ever before and it may be electrically driven.

Crucible life and lining life are extremely good. Trunions are adjustable for best balance and are supported on large pillow block bearings. A simple, convenient cover lifting mechanism is operated from the front of the furnace.

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along with plant application so that they may branch out from the traditional confines of a metal engineer and become full foundry engineers.

Large Foundries—Large foundries often have several metallurgical engineers, usually a chief metallurgist and one to three assistants, or even more. These assistants may be given other titles, such as sand control engineer, engineer of tests, quality control engineer, melting supervisor, etc.

Also, these foundries may employ graduate metallurgists to carry on special assignments, such as following particularly important orders through the shop, carrying on experiments in relation to new equipment or new materials or perhaps studying a new process to ascertain what results can be secured in the foundry under typical operating conditions.

Unfortunately, there are not too many positions for the research type of metallurgist available in industry at present.

Chief metallurgist who have educated themselves to the plan of quality control of the product now are moving into positions of assistant works managers, production managers or other key management positions. Other chief metallurgists, who know little concerning the control of quality in all the foundry departments, usually stay where they are.

Sales Engineers—Metallurgists are employed successfully by many foundries as sales engineers. Graduating engineers may be selected by foundries with the specific position of sales engineer in mind. If such is the case, the graduate metallurgist is given a course of learning in the various departments of the foundry, serves as a metallurgist on some phase of the product control activity for a short period and then is taken over by the sales department for further education. Such an engineer to be outstanding in his position must know a great deal about the following:

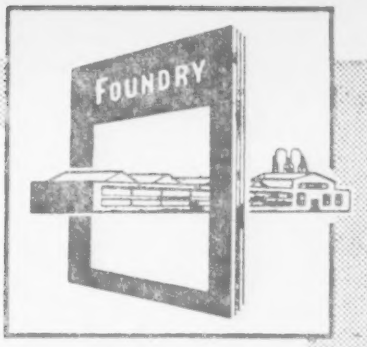
1. Advantages and properties of the cast metal with which he is working, as well as the advantages, disadvantages, properties, and some of the processing details of competitive materials and methods.

2. He must understand and be able to explain the fundamentals of casting design so that he can make suggestions to the customers' engineers.

3. He must be able to read blueprints.

4. He must know in detail the specifications of his cast product and the quality standards of his foundry.

(*Concluded on page* 253)



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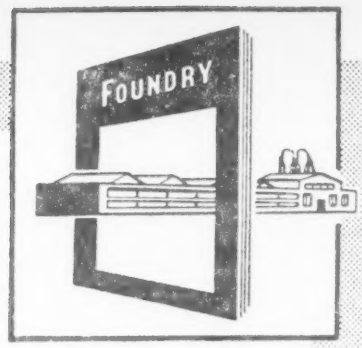

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(*Concluded from page* 250)

5. He should know the cost of all types of inspection and help the customer to select the type of inspection, depending on the service requirements, of the castings desired.

6. He must be awake to product development so that he can suggest that other structures which are being employed by the customer can be redesigned as castings.

It would seem, from the above list of qualifications, that the sales engineer should spend a few years in the foundry as a metallurgist so that he may acquire the tools necessary for the position.

There is an important need in the foundry for metallurgical engineers who understand the comprehensive nature of quality control of the product and will work with that end in view.

Book Review

Protective Atmospheres, by A. G. Hotchkiss and H. M. Webber, cloth, 341 pages, 6 x 9 in., published by John Wiley & Sons Inc., New York. Price, $7.

Based upon a series of articles entitled "Protective Atmospheres in Industry" which appeared in *General Electric Review*, this book is intended to assist individuals who supervise manufacturing operations to obtain a usable understanding of the various phases of protective atmospheres. These persons include process engineers, plant engineers and metallurgists. Emphasis has been placed on practical aspects of the subject, so that the work can serve as an operating manual.

Pangborn Corp. Marks Golden Anniversary

Pangborn Corp., Hagerstown, Md., will celebrate its golden anniversary during 1954. A series of events being planned to mark the celebration will culminate on Sept. 1, the official birthday of the firm.

Thomas W. Pangborn, president, sold his first sand blast machine in New York in 1904 and was joined by his brother, John C. Pangborn, in the following year. A plant established in Jersey City in 1909 was outgrown by 1912, at which time the business moved to Hagerstown.

Pangborn's facilities in Hagerstown include foundry, plate, sheet metal and machine shops; assembly plants and paint and woodworking shops. A beautiful public park, a gift to the city by the Pangborn brothers, is located adjacent to the plant.

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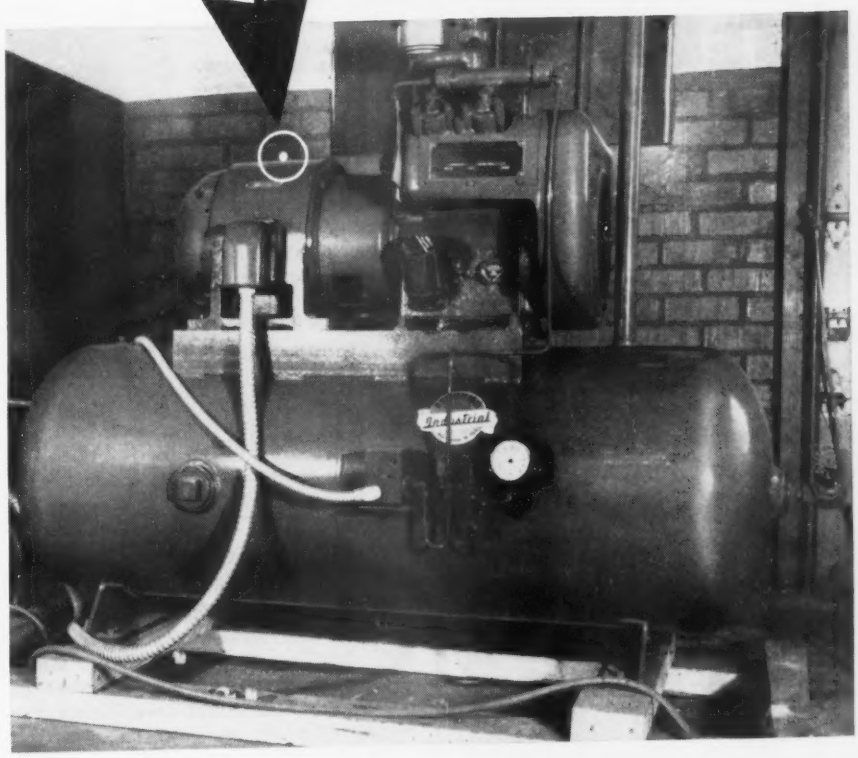
you can balance a Nickel on a

SCHRAMM AIR COMPRESSOR



Nickel-balancing on a Schramm Air Compressor was tried—and accomplished—by Homer J. Lockwood, plant superintendent of Bulldog Electric Products, Los Angeles, to prove to himself that Schramm Air Compressors are vibrationless—even when merely on factory skids on which they came!

When this particular Schramm Compressor was uncrated, Lockwood, needing compressed air immediately, started the unit running in a temporary area, on the unit's factory skids. Noticing how smoothly the compressor ran, he got his camera, ". . . set a nickel on edge on top of the motor", took his picture.

Daily, plants are using—and finding more uses for—Schramm Stationary Air Compressors for their many air jobs. Low initial cost, low installation and maintenance upkeep, and versatility, make Schramm an indispensable piece of equipment.

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TRADE PUBLICATIONS

For More Details Use Reply Card—Page 217

SHELL MOLDING: Builders Iron Foundry Inc., 345 Harris Ave., Providence, R. I.—Information on the shell molding process is available in bulletin 100-K12, which describes foundry technique, illustrates how a typical shell mold casting is made and contains pictures of castings made by the method as well as comparative case histories of castings made by shell molding and green sand molding.

For More Details Circle No. 101—Page 217

TAPE LABELS: Labelon Tape Co., 450 Atlantic Ave., Rochester 9, N. Y.—Brochure covers such products as a plastic self-sticking tape that can be written on and used for labeling, pressure sensitive paper tapes and others. Various types available and their applications are listed.

For More Details Circle No. 102—Page 217

AIR VIBRATORS: Cleveland Vibrator Co., 2788 Clinton Ave., Cleveland 13—An engineering data sheet which can be filled out and returned for free information and advice on vibrator requirements is a feature of catalog 109. It also describes the company's line of equipment and illustrates its operation.

For More Details Circle No. 103—Page 217

INDUSTRIAL TRUCKS: Lewis-Shepard Products Inc., Dept. R-31, 1076 Walnut St., Watertown, Mass. —October issue of *The Lever,* the company magazine, highlights 12 handling problems and their actual solutions in plants throughout the country. Both hand and electric-powered trucks are shown and described.

For More Details Circle No. 104—Page 217

WIRE ROPE: Leschen Wire Rope Division, H. K. Porter Co., St. Louis 12—"What's the Difference in Wire Rope," a brochure for wire rope buyers, explains differences in the selection of wire going into various rope and in the manufacturing processes. It also itemizes differences in results.

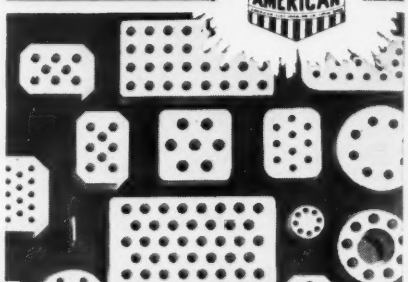
For More Details Circle No. 105—Page 217

CARBON: Portland Gas & Coke Co, Public Service Bldg., Portland 4, Oreg.—Booklet on high purity carbon contains technical information of interest to concerns which want to raise the carbon content of steel. It describes a carbon which is said to contain only 1/10 of 1 per cent of ash.

For More Details Circle No. 106—Page 217

ELECTRODES: Electrode Division, Great Lakes Carbon Corp., Hancock Bldg., Niagara Falls, N. Y. —Results of studies made by the firm's electrode specialists on the effects of tighter joint assemblies on efficient electric furnace operations is available in "Improved Standards

AMERICAN CERAMIC STRAINER CORES are "Foundry Tested"



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of Electrode Performance." The booklet also features an illustrated list of approved practices in adding electrodes to the column.

For More Details Circle No. 107—Page 217

MATERIALS HANDLING: Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee 1 — New methods in bulk and packaged materials handling are pictorially described in a brochure entitled "Modern Materials Handling." Capacity, horsepower, weight and other basic data on the firm's equipment and necessary attachments are included in the booklet.

For More Details Circle No. 108—Page 217

STORAGE BATTERIES: Gould-National Batteries Inc., Trenton 7, N. J.—Sixth edition of the company's "Red Book" for users of storage batteries for cycle service opens with a brief treatise on the theory of the lead-acid battery. Four subsequent sections give instructions on care and operation of batteries and other pertinent data.

For More Details Circle No. 109—Page 217

DOCUMENT REPRODUCTION: Industrial Sales Division, Eastman Kodak Co., Rochester 4, N. Y.—New edition of "Modern Drawing and Document Reproduction" provides up-to-date data and information on the characteristics of reproduction materials, including new sections on projection positive paper and microprint paper.

For More Details Circle No. 110—Page 217

HAND PUSHED TROLLEYS: Jervis B. Webb Co., 8951 Alpine Ave., Detroit—Two-color catalog 453 presents complete specifications on hand pushed trolleys, cranes and switches intended for applications where a mechanical method of handling products is required intermittently, but the cost of a power driven trolley is not justified.

For More Details Circle No. 111—Page 217

POWER TRANSMISSION: Grant Gear Works Inc., 154 West Second St., Boston 27—Spiral bound for easy reference, catalog contains 40 pages of useful tables and engineering information relating to power transmission and describes the firm's entire line of stock gears, speed reducers, sprockets and chains, couplings and special gears.

For More Details Circle No. 112—Page 217

SAND CONTROL: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Folder describes a complete, automatic sand control system, including units that automatically add base water, determine sand temperature and compensate for evaporated water, test sand and record test data,

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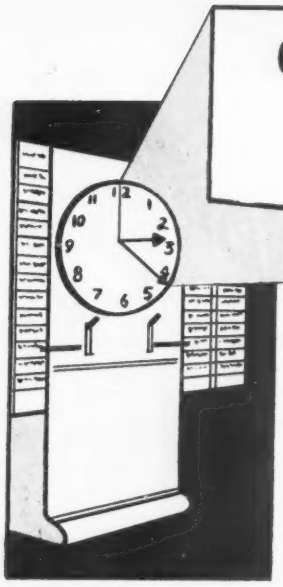

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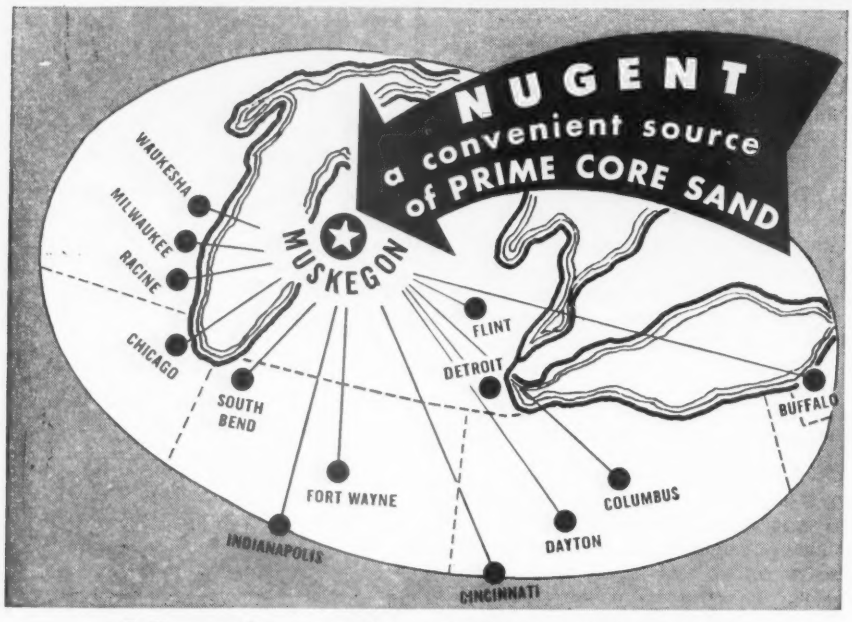

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time and cycle mill and system operations, add bond and other additives and automatically operate sand plows above hoppers.
For More Details Circle No. 113—Page 217

MAGNESIUM DOCKBOARDS: Magnesium Co. of America, Materials Handling Division, East Chicago, Ind.—"Look into These Facts about Dockboards" is the title of a file of material which presents specific facts on magnesium dockboards used to bridge the gap between loading docks and rail cars or highway trailers.
For More Details Circle No. 114—Page 217

PURIFIERS AND SEPARATORS: Purifier Division, V. D. Anderson Co., 1935 West 96th St., Cleveland 2—Selection of purifiers and separators has been plotted in graph form in bulletin 201, enabling users to avoid working out long equations and formulas. Installation diagrams, tables of dimensions and weights and other buying information are included.
For More Details Circle No. 115—Page 217

ALLOYS: H. Kramer & Co., 1339-1345 West 21st St., Chicago 8—Volume 27 of *Kramer Alloy News*, company publication, contains an article on silicon brass, a table of the various specifications for copper-base alloys, a continuation of a series on the brass and bronze ingot industry and photographs of the company's laboratory and research facilities.
For More Details Circle No. 116—Page 217

INDUSTRIAL FILMS: Wilbur Streech Productions, 1697 Broadway, New York 19—Booklet entitled "Business, Industry and Film" points out how motion pictures can serve the needs of modern business by performing important functions for management in the fields of public relations, selling, sales promotion, production and sales training.
For More Details Circle No. 117—Page 217

PYROMETER CALIBRATION: Bristol Co., Waterbury 20, Conn.—New issue of "Pyrometer Thermocouple Calibration Data" offers new tables based on data recently released by the National Bureau of Standards and adopted by the Scientific Apparatus Makers Association and the Instrument Society of America.
For More Details Circle No. 118—Page 217

HEAT PROCESSING: Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15, N. Y.—Third edition of "Hauck Industrial Combustion Data" provides 168 pages of material on heat processing applications for individuals concerned with the selection, supervision, operation and maintenance of oil and gas combustion equipment.
For More Details Circle No. 119—Page 217

DEW POINT CONTROLLER: Ipsen Industries Inc., 715 South Main St., Rockford, Ill.—Dew point control unit's adaptability to different metal treating furnaces and t

various heat treating operations is explained in bulletin C-21. The instrument automatically indicates, records and controls dew point in controlled atmosphere heat treating furnaces.

For More Details Circle No. 120—Page 217

POWER AND FLUID HANDLING: Worthington Corp., Harrison, N. J.—*Power and Fluids* is the title of a new technical publication the company plans to present quarterly to make available useful and authoritative information for readers in the power and fluid handling fields.

For More Details Circle No. 121—Page 217

INDUSTRIAL PRODUCT: Johns-Manville, Box 60, New York 16—Catalog entitled "J-M Products for the Process Industries" offers concise data on the properties of such products as insulations, refractories, insulating brick, p'pe, packings and gaskets. Photographs of typical installations are included

For More Details Circle No. 122—Page 217

METAL ABRASIVES: Harrison Abrasive Division, Metals Disintegrating Co., P. O. Box 290, Elizabeth, N. J.—The subject of technical bulletin No. 6 is how to run a production test of metal abrasives. Step-by-step test procedure and pictorial examples of data, plot and comparative evaluation sheets are included in the contents.

For More Details Circle No. 123—Page 217

FLOOR SURFACE: Flash-Stone Co., 3723 Pulaski Ave., Philadelphia 40—Nature and advantages of a floor surface for areas subjected to extreme production or traffic abuses are explained in terms of materials used and how they are installed.

For More Details Circle No. 124—Page 217

FORK LIFT TRUCKS: Towmotor Corp., Division 7511, 1226 East 152nd St., Cleveland 10—King-s'zed folder describes and illustrates the com-

"Hi, Boss, aren't you getting a little old to be playing in the sand?"

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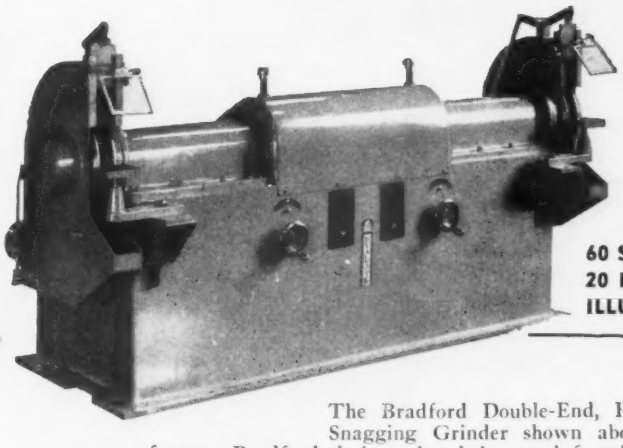

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pany's complete line of fork trucks and cites a number of case histories of specific applications to demonstrate the savings they have made possible.

For More Details Circle No. 125—Page 217

AIR-WEIGHT CONTROL: Askania Regulator Co., 240 East Ontario St., Chicago 11—Booklet describes constant air-weight control which automatically controls air-weight delivery from motor-driven centrifugal cupola blowers. Operation, applications, features and specifications are given in bulletin 158.

For More Details Circle No. 126—Page 217

RELEASE COATING: W. H. Brady Co., 727 West Glendale Ave., Milwaukee 12—Booklet 122 explains advantages of a chromatic adhesive release coating developed by the firm and now used on its self-sticking products, such as wire markers, safety signs, dotted line aisle markers, write-on label and similar items.

For More Details Circle No. 127—Page 217

PORTABLE HOISTS: Coffing Hoist Co., 800 Walter St., Danville, Ill.—Full line catalog contains illustrations, descriptions and specifications for over 100 different types and sizes of portable hoists, as well as information on a wide variety of utility maintenance tools.

For More Details Circle No. 128—Page 217

GEAR MOTORS: General Electric Co., Schenectady 5, N. Y.—Bulletin GEA-1437H concerns gear motors with ratings of from 1/6 to 200 hp. A table listing more than 200 gear motor applications explains how to select the proper motor, depending on use, load classification and length of daily operation.

For More Details Circle No. 129—Page 217

GENERATORS: Induction Heating Corp., 181 Wythe Ave., Brooklyn 11, N. Y.—Bench type, two-position, 2½ and 3½ kw electronic induction heating generators for brazing, soldering, hardening, annealing and melting are discussed in this illustrated brochure.

For More Details Circle No. 130—Page 217

SENSING UNITS: Wheelco Instruments Division, Barber-Colman Co., Rockford, Ill.—Bulletin TC-10 is a data book and catalog of sensing units and control accessories. Products covered include thermocouples, radiation detectors, resistance bulbs and other instruments.

For More Details Circle No. 131—Page 217

ENCLOSED CONDUCTORS: Insul-8-Corp., 1285 Rollins Rd., Burlingame, Calif.—Pamphlet 83 covers a flexible system of enclosed conductors for cranes and monorails that is said to be comparable in cost to a bare bar system.

For More Details Circle No. 132—Page 217

SILICONE PRODUCTS: Dow Corning Corp., Dept. AH-11, Midland, Mich.—Reference guide to silicone products for 1953-54 describes prod-

ucts listed in terms of applications and operating and service characteristics. Fifteen new products ranging from adhesives to molding compounds have been added, and the application index has been expanded to include three new categories.
For More Details Circle No. 133—Page 217

ANTIRUST PAINT: Speco Inc., 7308 Associate Ave., Cleveland 9—Product information bulletin 55319-R deals with an antirust paint, available in six colors, that can be used as finish coats for structural steel, machinery, roofs, building trim and other applications.
For More Details Circle No. 134—Page 217

ELECTRIC HOISTS: Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.—The company's line of lightweight electric hoists for intermittent duty is discussed in bulletin 182, which presents complete data concerning construction and operation of the units.
For More Details Circle No. 135—Page 217

AUTOMATIC SPRINKLERS: Globe Automatic Sprinkler Co., 250 Park Ave., New York 17—Brochure shows how fire safety cuts yearly insurance costs and illustrates "spray" type of automatic sprinkler, with a fusible element of solid organic chemical.
For More Details Circle No. 136—Page 217

GAMMA RADIOGRAPHY: Technical Operations Inc., 6 Schouler Court, Arlington 74, Mass.—Catalog contains information on Cobalt 60 sources and on such accessory equipment as exposure shields, shipping and storage containers, instruments and film badge service.
For More Details Circle No. 137—Page 217

FLOORS: Monroe Co., 10703 Quebec Ave., Cleveland 6—Brochure 168-11 covers differences between floor requirements for various industries and lists the company's floor resurfacing and repair products, including outstanding qualities and uses of each.
For More Details Circle No. 138—Page 217

BOOKKEEPING MACHINE: Remington Rand Inc., 315 Fourth Ave., New York 10—Booklet AB-824 offers information on a bookkeeping machine that permits automatic computation and proof of net pay for each employee.
For More Details Circle No. 139—Page 217

MACHINE TOOLS: South Bend Lathe Works, 425 East Madison St., South Bend 22, Ind.—Complete story about the company's machine tool attachments and accessories has been collected in bulletin 5321C, which contains 160 illustrations.
For More Details Circle No. 140—Page 217

PYROMETER SUPPLIES: Minneapolis-Honeywell Regulator Co., Industrial Division, Wayne & Windrim Aves., Philadelphia 44—Pyrometer supplies are illustrated and described in newly revised buyer's

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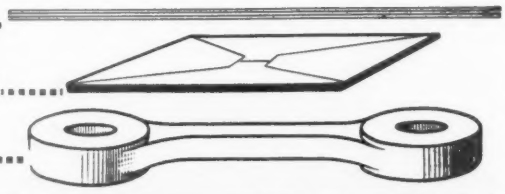

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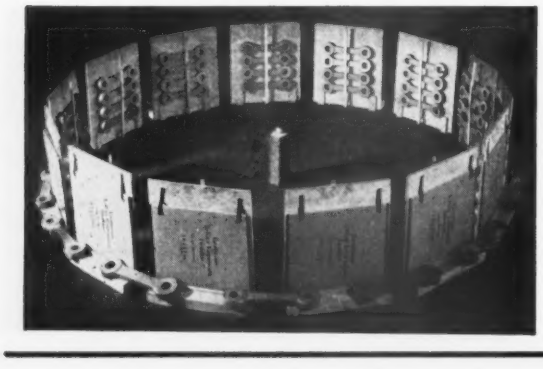
Illustration shows 60 steel castings being photographed simultaneously. The gamma rays, flying in all directions, go through all the castings at once, making 60 exposures of the 60 castings



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guide 100-5. All general thermocouple asemblies and components are listed, as well as many special purpose items. Prices and several pages on selection, care and application of thermocouples round out the catalog.

For More Details Circle No. 141—Page 217

INDUSTRIAL OVENS: W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2—Design features and engineering flexibility of 13 types of industrial ovens in the company's complete line are explained fully in bulletin 200.

For More Details Circle No. 142—Page 217

CHAINS: Chain Belt Co., Dept. P. R., Milwaukee 1—Bulletin 53-59 discusses and illustrates new drive and conveyor chains. Exploded pictures show details of chain construction, and a reference table indicates the chains that are replaced by the new series.

For More Details Circle No. 143—Page 217

HAND HOISTS: Yale & Towne Mfg. Co., Philadelphia 15—Booklet on hand hoists with capacities from ½ to 2 tons lists models available and enumerates design features and operating advantages.

For More Details Circle No. 144—Page 217

BELT FASTENERS: Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44—Bulletin F-100 contains data and price lists for rip plates, conveyor and elevator belt fasteners and for the tools they require.

For More Details Circle No. 145—Page 217

FOUNDRY OVENS: Michigan Oven Co, 415 Brainard, Detroit 1—Folder pictures and describes various types of foundry ovens and enumerates their features and advantages.

For More Details Circle No. 146—Page 217

MAGNETS: Dings Magnetic Separator Co., 4740 West Electric Ave., Milwaukee 46 — Bulletin B-1403-A deals primarily with a magnet hoist, but also lists such other products as

"A week in there and they think twice about violating a safety rule."

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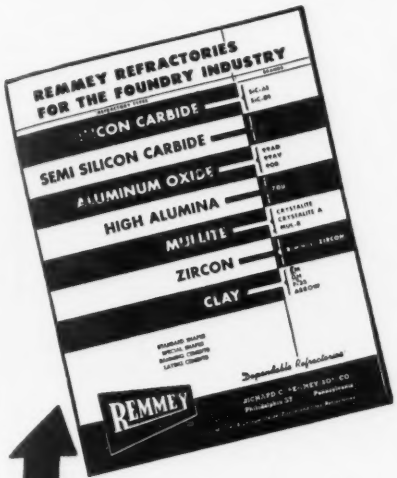

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nonelectric drum scrap separators, plate magnets, magnetic pulleys and others.
For More Details Circle No. 147—Page 217

AIR TOOLS: Thor Power Tool Co., Aurora, Ill.—Complete illustrations, descriptions and specifications on the organization's No. 2 series of lightweight, air operated drills, grinders, screwdrivers and nut setters feature catalog JE-1660.
For More Details Circle No. 148—Page 217

CATALYTIC EXHAUST: Oxy-Catalyst Inc., Wayne, Pa.—Folder relates how device for removing carbon monoxide, fumes and odors from all types of gasoline powered equipment permits safe indoor operation of gasoline engines.
For More Details Circle No. 149—Page 217

PROTECTIVE COATING: Industrial Metal Protectives Inc., 401 Homestead Ave., Dayton 8, O.—Illustrated brochure contains complete information on protective coating for iron, steel and aluminum products. Various applications are shown.
For More Details Circle No. 150—Page 217

DIAL THERMOMETERS: Foxboro Co., Foxboro, Mass.—Bulletin 467 provides data on dial thermometers for long distance measurement and emphasizes the variety of ranges and bulbs, tubing and accessories available.
For More Details Circle No. 151—Page 217

GAS-OIL BURNERS: Eclipse Fuel Engineering Co., Rockford, Ill.—Bulletin R-230 discusses closed flame gas-oil burners and their applications, provides diagrams, lists specifications and includes schematic layouts.
For More Details Circle No. 152—Page 217

VIBRATING SCREEN: Hewitt-Robins Inc., Stamford, Conn.—Booklet 122-J concerns a new vibrating screen recommended for a variety of applications, including foundry clean-up work.
For More Details Circle No. 153—Page 217

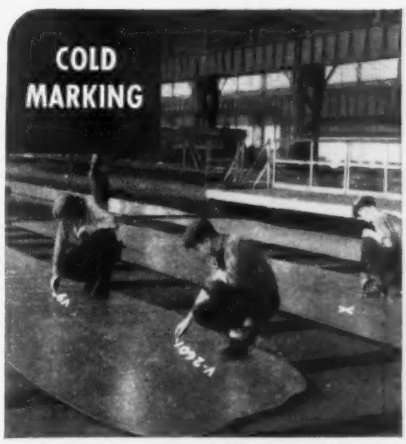
SHELL MOLD MACHINE: Southern Shell Mold Equipment Co., Chattanooga, Tenn.—Folder explains the operation of a shell molding machine and presents a typical shell molding layout.
For More Details Circle No. 154—Page 217

TRANSMISSION BELTING: Goodyear Tire & Rubber Co., Akron, O.—Brochure A5163K illustrates and describes rayon transmission belting and cites its claimed advantages over belting with cotton plies.
For More Details Circle No. 155—Page 217

CHILL NAILS: Standard Horse Nail Corp., New Brighton, Pa.—Folder lists June 1, 1953, prices of special mild low carbon steel foundry chill nails and spider chills.
For More Details Circle No. 156—Page 217

SPACE HEATERS: Bica Co., 1170 North State St., Girard, O.—Brochure is devoted to the company's complete line of portable space heaters, including several new models.
For More Details Circle No. 157—Page 217

Paintstiks are widely used for marking hot surfaces up to 2000°F. They will out last hot chalk 3 to 1 depending upon surface temperature. Marks instantly and will not run, char or flow. Markings are PERMANENT . . . immersing in water will not deface them . . . markings removed in pickling bath.



Paintstiks will mark surface at temperatuers of -50°F. to 150°F. Markings withstand weather . . . are highly legible and are PERMANENT . . . Colors fadeproof . . . markings can be made on icy, wet, dry, oily, smooth or rough surfaces. Marks do not peel, dry out or rust off even under prolonged corrosive weathering.

A complete line for hot or cold use offers a choice of the correct stik to meet any condition.

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1 YEAR'S water extraction from air lines equipped with Adams Aftercooler and Cyclone Separator.

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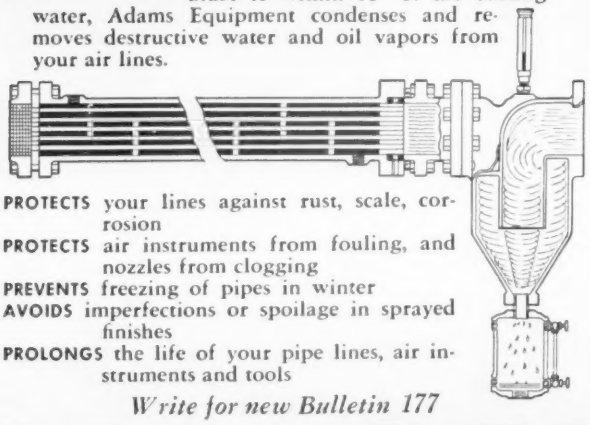
● Reducing compressed air temperature to within 10° of the cooling water, Adams Equipment condenses and removes destructive water and oil vapors from your air lines.



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Choose the "Oliver" Jig Saw

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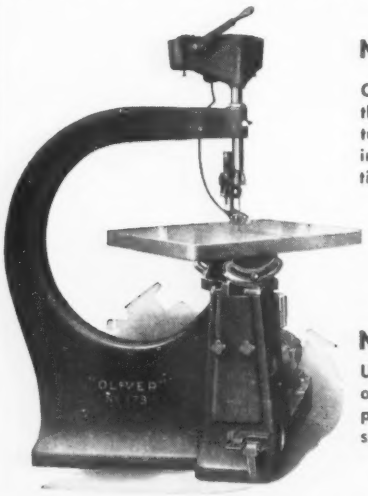
● Interior and exterior scroll work are easily cut on heavy duty "Oliver" Jig Saws. Cut wood at high speed. Also cut light metals. Unlimited capacity. Unmatched for easy, smooth operation.



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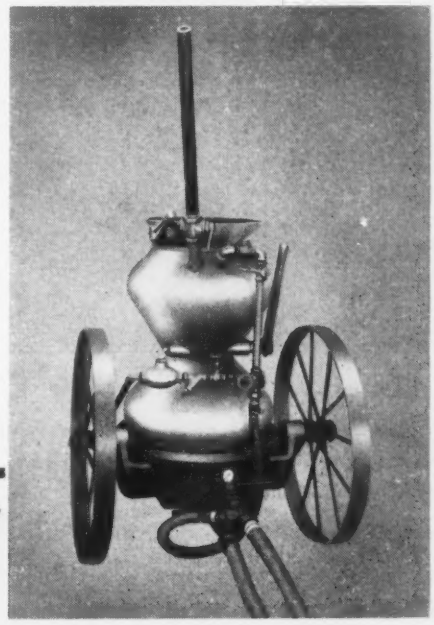

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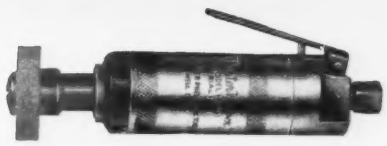

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IF YOUR PROBLEM INCLUDES
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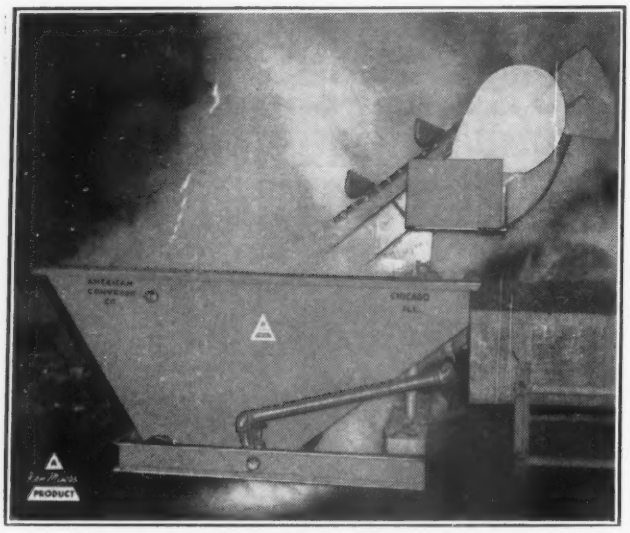
APSDU* PROMOTES SAFETY SAVES MANPOWER HOURS



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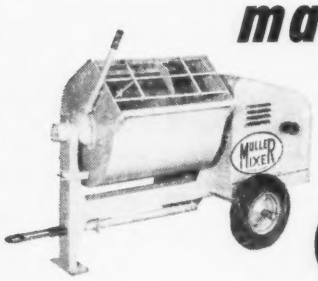

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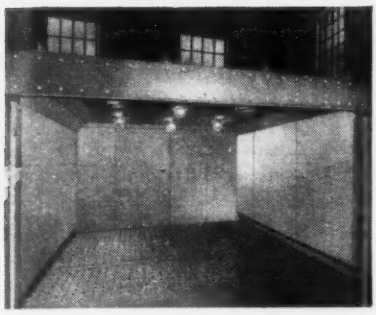

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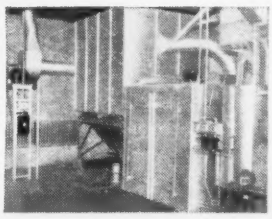

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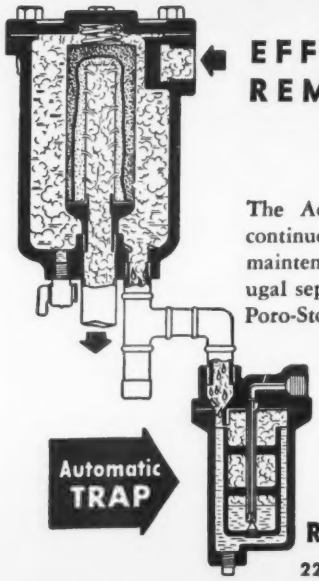
FOR COMPRESSED AIR



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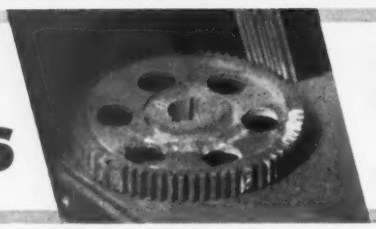

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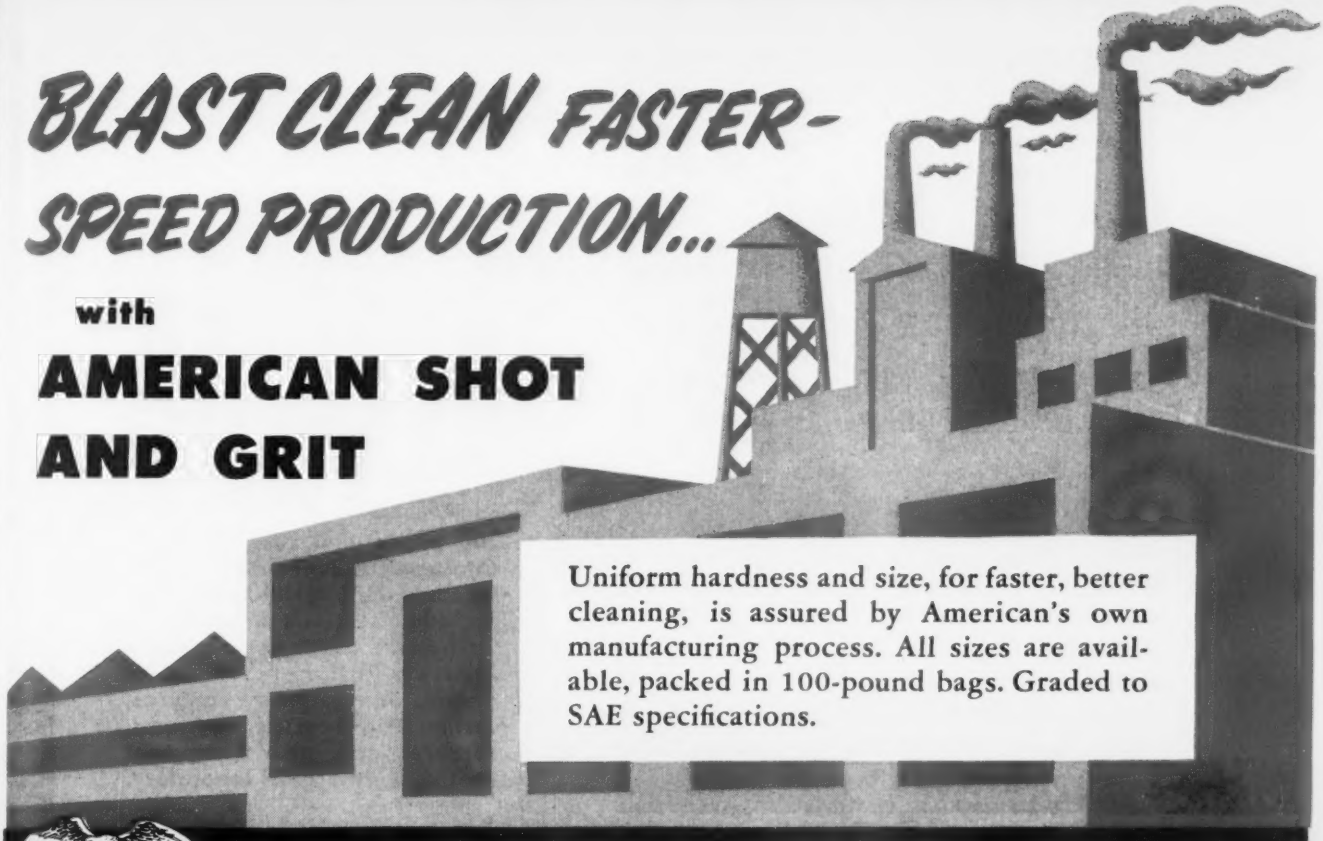

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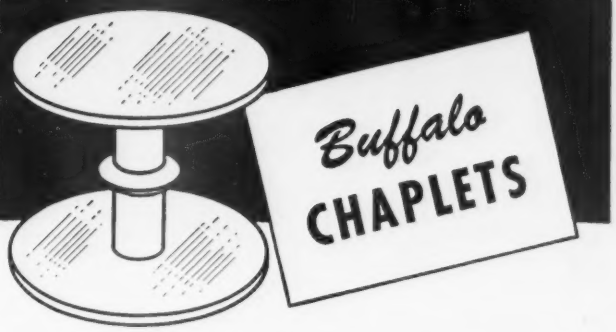

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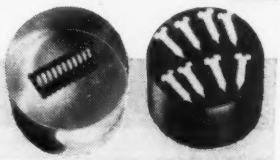

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To help foundrymen minimize and eliminate defective castings. Thirty-one basic casting defects are listed and described. Defects are defined simply and completely, illustrated by 101 figures collected from foundries of the United States and Canada.

THE PENTON PUBLISHING COMPANY
Book Department
1213 W. 3rd St., Cleveland 13, Ohio

(Advertisement)

GET THE MOST FOR YOUR MAINTENANCE DOLLAR!

With this ¾ ton capacity unit, you can haul bulk loads like scrap or concrete—haul heavy repair or maintenance items on the flat bed—plow snow or do light grading with the blade accessory—keep down weeds or control insects with 50 gal. sprayer attachment.

Interchangeable bucket and flat bed latch onto Prime-Mover chassis . . . blade and sprayer attached in jiffy. Works indoors—outdoors, through narrow doors, on rough ground, in all kinds of weather. Take the load off your maintenance men with a Prime-Mover. Write for On-the-Job data, **Prime-Mover Co., Muscatine, Iowa.**

EMPIRE

"THAT GOOD" FOUNDRY COKE

DEBARDELEBEN COAL CORPORATION
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HOW TO USE THE CUPOLA—

$1.00
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NEW 36 PAGE HANDBOOK
by Bernard P. Mulcahy,
Pres. of Fuel Research Lab. Inc.

13 HELPFUL CHAPTERS ON ALL PHASES OF THE CUPOLA. "How To Use The Cupola" . . . . 13 idea-packed chapters based on the practical experience of a man who has devoted his life to foundry fuel and melting problems. It's a mighty useful handbook—a handy source of information which will pay for itself many times over in the months and years ahead.

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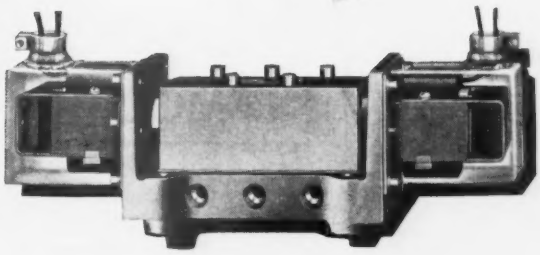
Quick-As-Wink AIR AND HYDRAULIC Control Valves

FEATURE THIS MONTH



1/8" and 1/4" Double Solenoid Valves

Their reduced amperage requirement simplifies electrical circuits

● These valves are extremely simple in design—but ruggedly built—and will give millions of cycles of efficient, trouble-free, dependable operation. For air to 125 psi, vacuum, or low pressure hydraulic service. Up to 300 cycles a minute. Solenoid armature bears directly against the valve plunger eliminating levers, links, pins, etc. Low amperage requirement simplifies the electrical circuit. The valve is reversed by energizing first one solenoid, then the other. The valve and both solenoids are mounted on an aluminum base, and can be removed independently without disturbing the piping. 2-way, 3-way, double 2-way, 4-way and 5-way actions.

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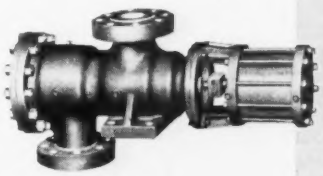
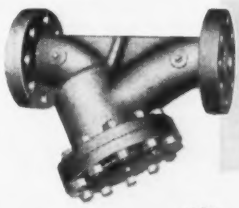


DESCALING VALVES

Specially designed for descaling hot strip and large steel forgings. Widely used. 2" to 6" sizes. Capacities to 1550 Gals./Min. Design eliminates destructive water hammer and reduces hydraulic shock to a minimum.

HIGH PRESSURE STRAINERS

Used ahead of descaling valves to prevent foreign material from plugging spray nozzles causing scale streaks in strip—also in hydraulic lines to protect valves, cylinders, and other machinery. 1½" to 6" sizes. Highly efficient. Easily cleaned.



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C. B. HUNT & SON, Inc.

Hand, Foot, Lever, Cam, Pilot, Diaphragm and Solenoid Control Valves

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Don't "Fiddle"

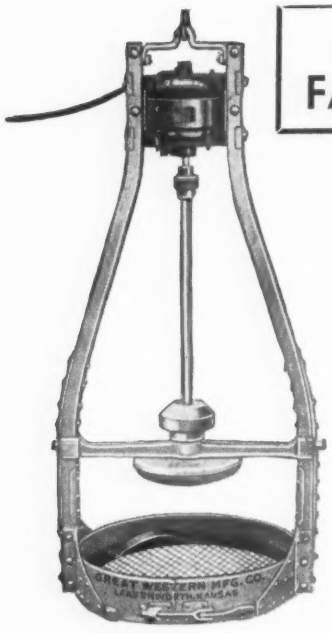
with an

Old Fashioned Riddle . . .

switch to

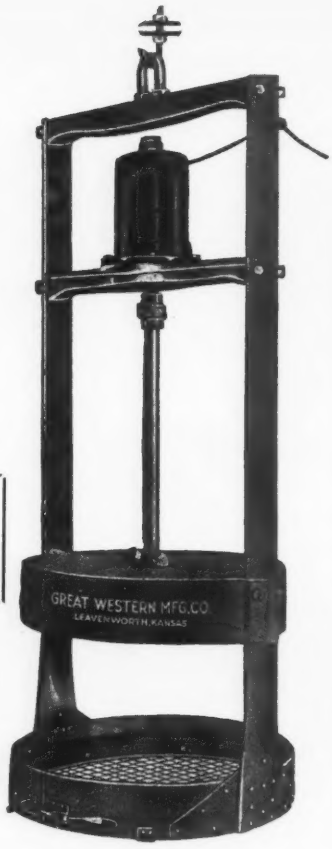
COMBS FOUNDRY RIDDLES

WORLD FAMOUS!



Type "V"

Screens sand Fine, Coarse, Medium 20" dia. sieve with special clamp for 5-second changes. Does work of 10 men. Fully-enclosed 1/6 h.p. motor. 4' 6" high, weight 100 lbs. 20" Sieve: $250.00. Giant V-5, 36" Sieve: $450.00



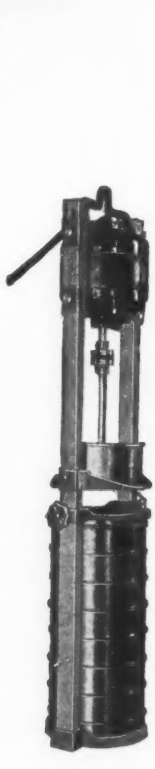
Type "CR"

24" dia. round sieve. Thoroughly sifts, mixes, fluffs, aerates the sand. 1/3 H.P. enclosed motor. Height 4' 6", weight 250 lbs. Complete: $310.00

Type "CS"

24" square sieve. Continuous operation, no dumping. Refuse tails off to one side.

Height 4' 10", weight 295 lbs. With 1/3 h.p. enclosed motor. Complete: $320.00



Type "HL"

Laboratory model . . . specially designed for sand control. Fitted with 1/6 H.P. motor. Price, complete less sieves: $225.00

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GREAT WESTERN MFG. CO.

LEAVENWORTH • KANSAS

call on Foundry's PLUS 5 SERVICE

to put extra push behind your sales program

What is PLUS 5? It's your key to more business from foundries. It gives every FOUNDRY advertiser a bonus he can get from no other source. Here is help in analyzing this market—studying sales territories and potentials—planning the sales effort—and creating a constructive promotion program to the 5 billion dollar foundry market. It's time to take a new look at this market—and at the unusual selling aids we have for you. Say PLUS 5 to your FOUNDRY representative and he'll show you this 5-step program designed to move more of your products into foundries.

A Penton Publication

FOUNDRY

more than a magazine . . . a complete sales development service

Penton Building, Cleveland 13, Ohio

CLASSIFIED ADVERTISING

Help Wanted

METALLURGIST

Leading, progressive, precision investment casting concern offers outstanding opportunity for capable metallurgist with high temperature alloys experience. Radiographic and customer contact experience helpful. TOP SALARY.

APPLY TO:
Personnel Manager
MICROCAST DIVISION
Austenal Laboratories, Inc.
7001 South Chicago Ave.
Chicago 37, Illinois

WORKS MANAGER

Well-known steel foundry located in middle west, with 400 ton capacity, has opening for works manager or assistant works manager.
Must be a technical man of proven ability. Submit data covering experience, education, age, references and salary desired.
All replies confidential.

BOX 902
FOUNDRY CLEVELAND 13, OHIO

FOUNDRY SUPERINTENDENT

Unusual opportunity in 15-molder aluminum foundry located metropolitan area of New York. Must have thorough knowledge of machine bench and floor molding, gating and set-ups for production and jobbing. Applicant must know all phases of foundry work and be capable of producing air-tight and porous-free aluminum castings economically. Prefer man not over fifty years of age. State qualifications. This is a GOOD OPPORTUNITY for a good man. Address: Box 894, FOUNDRY, Cleveland 13, Ohio.

WANTED
CUPOLA MAN

To operate cupola in medium size foundry, located in Indiana, pouring 45 to 55 tons of iron per day. Modern foundry with complete mechanical cupola charger and bondactor. Pour iron 4 hours per day. Excellent opportunity for right man. State age, past experience and salary expected. Address: Box 901, FOUNDRY, Cleveland 13, Ohio.

CHIEF INSPECTOR
FOR STEEL FOUNDRY

Medium sized steel foundry located in the East requires chief inspector. Company manufactures valve, turbine, machine tool and ordnance castings from 1 lb. to 2,000 lbs. In reply give details of experience, salary desired, etc. Address: Box 856, FOUNDRY, Cleveland 13, Ohio.

FOREMAN

Aggressive nonferrous foundry foreman capable estimating and taking complete charge foundry operations. Prefer metallurgical training also. Midwestern city, medium sized operation. Excellent opportunity. Give full references first letter. Address: Box 906, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Gray iron job foundry. Practical and technical knowledge in sand and nodular iron. Must have low scrap record and outstanding labor relations. Machine tool castings weighing up to 16 tons. Pouring up to 35 tons per day. Sixty employees. Excellent opportunity for top man. Address: Box 895, FOUNDRY, Cleveland 13, Ohio.

EQUIPMENT SALES ENGINEER

Leading foundry equipment manufacturer seeks experienced sales engineer for profitable Eastern territory. Must have both foundry and sales experience. Write, giving full details of personal background, experience and references. Address: Box 908, FOUNDRY, Cleveland 13, Ohio.

CHIEF INSPECTOR

Aluminum permanent mold foundry. Must be experienced in foundry procedures as well as casting layout and inspection. Good opportunity for qualified man. Give full details. Address: Box 903, FOUNDRY, Cleveland 13, Ohio.

Help Wanted

SALES ENGINEER

Major core oil manufacturer seeks qualified sand technician, age 25 to 38, for core oil sales and service, Dayton-Indianapolis-Chicago and adjacent area. Straight salary, all business expenses, full employee benefits. Write giving qualifications.

PENOLA OIL COMPANY—DEPT. 21
3780 PENOBSCOT BUILDING
DETROIT 26, MICHIGAN

FOREMAN

Malleable foundry supervisor. Experienced with machine floor molding. High production. Must be able to handle men.

BOX 898
FOUNDRY CLEVELAND 13, OHIO

SUPERVISOR

Brass foundry foreman. Experienced in solid and snap flask molding. Must have ability to handle men.

BOX 897
FOUNDRY CLEVELAND 13, OHIO

CONSULTING AND
SERVICE METALLURGIST

Must have technical background and malleable foundry experience.
Should have inclination and personality to work towards sales position and be prepared to travel. Write stating full details and salary expected.

BOX 729
FOUNDRY CLEVELAND 13, OHIO

CHIEF INSPECTOR

Experienced in lay-out and inspection of miscellaneous steel castings of medium and large size. Write experience work history and salary desired. Address: Box 914, FOUNDRY, Cleveland 13, Ohio.

PATTERN SHOP FOREMAN

Must have thorough knowledge of patterns used in production of railroad castings. Send resume of education and experience. Address: Box 913, FOUNDRY, Cleveland 13, Ohio.

CHIEF METALLURGIST

Steel foundry. Knowledge of sand control essential. Submit complete work history record and salary desired. Address: Box 912, FOUNDRY, Cleveland 13, Ohio.

GENERAL FOREMAN

Cleaning room of steel foundry located in Western Pennsylvania. Must be good producer, handle men well. Write details. Address: Box 915, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

GRAY IRON FOUNDRY EXECUTIVE

Well versed in all phases of foundry procedures available. Molding, light and heavy. Green and dry sand. Coremaking, cupola operation, gray iron metallurgy, foundry costs, customers contacts. Thirty years foundry executive experience various capacities. Presently employed. Address: Box 876, FOUNDRY, Cleveland 13, Ohio.

FOREMAN—WOOD PATTERNMAKING

Twenty years as foreman and department manager. Experienced in the machine tool and heavy mill industry. Also experienced in purchasing patterns and castings. Complete coordinating service. Iron and steel foundry background and connection. References and resume on request. Address: Box 868, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Superintendent or general foreman. Practical man. Twenty-seven years' experience in gray iron and nonferrous jobbing and high production shops. Now employed. Western or central New York preferred but not essential. Address: Box 909, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

STEEL FOUNDRY MANAGER
OR
SUPERINTENDENT

Thirty years supervisory experience producing carbon, low alloy and high alloy steel castings, starting as molding foreman through to works manager. College degrees in engineering and metallurgy, but primarily a practical foundryman with complete knowledge of all phases of production, modern foundry techniques, laboratory control, heating and gating, furnace operation, molding, heat treatment, cleaning and finishing, maintenance, plant layout and labor relations. Have increased efficiency, trained men, cut scrap and costs, administered incentive and bonus plans and improved safety record. Capable of assuming complete charge of plant operations. Address: Box 916, FOUNDRY, Cleveland 13, Ohio.

NONFERROUS FOUNDRY CONSULTANT

Metallurgical education and background. Age 42, Midwest location. Twenty years' experience foundry and machine shop executive; research director; research and consulting metallurgist and foundry engineer; and advertising manager. Knowledge and experience covers industrial and scientific research; foundry and smelting industries. Retainer or short assignments considered. Will travel. Address: Box 918, FOUNDRY, Cleveland 13, Ohio.

SECONDARY ALUMINUM SMELTING PLANT
GENERAL SUPERINTENDENT

Experienced in planning and adjusting of secondary aluminum alloys from scrap metal to finished ingot. Ability to handle men, familiar with the construction of furnaces and timely developments. Age 44, family man, desire change for personal reasons. Salary $12,000 per year. Must give 90 days notice. Address: Box 907, FOUNDRY, Cleveland 13, Ohio.

GENERAL FOREMAN OR
SUPERINTENDENT

For cleaning division, will help reduce cost. Well qualified to head this division also know Standards and Methods. Address: Box 905, FOUNDRY, Cleveland 13, Ohio.

WEIGHT ESTIMATING

Estimating of casting weights furnished by return mail. Accurate, reliable and confidential service. Automatic calculator equipment. Nominal fee. Send blueprints to: CHARLES E. ROLAND, ITASCA, ILLINOIS.

INDUSTRIAL ENGINEER

Several years of experience in steel, gray iron, malleable and aluminum. Do you want your cost reduced? Also well qualified to operate department and assist management. Address: Box 904, FOUNDRY, Cleveland 13, Ohio.

SALES OR ADMINISTRATION

College graduate, business administration. Apprentice school graduate (foundry practice) with five years practical foundry experience. Desire position in sales or administration. Address: Box 891, FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRYMAN—
SUPERINTENDENT

Thirty years of practical experience in all phases of the foundry industry, malleable iron, gray iron and ductile iron. Address: Box 890, FOUNDRY, Cleveland 13, Ohio.

EXECUTIVE

Experienced in all phases of foundry operation and management with thorough knowledge of each shop process, engineering, metallurgy, cost estimating and accounting, sales and industrial relations. Technical graduate. Excellent recommendations. Address: Box 889, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Twenty-two years practical and technical experience producing iron, steel and related alloys for broad field of applications including high pressure and centrifugal castings. Previous supervisory experience of acid and basic electric melting, coremaking, oil and resin sands, molding, jolt, squeeze, slinger and floor, and cleaning room. Age 40. Excellent references. Address: Box 888, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Most thoroughly experienced in managing gray iron production or jobbing operations. Qualified to show you how to have a highly efficient and a low cost operation. Are you interested? Address: Box 919, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

MUNICIPAL CASTING MANUFACTURERS

Expert in adapting almost any size or design castings to sandslinger production. Guarantee to meet or beat competition in Mississippi, Alabama, Louisiana or Texas trade areas. Age 35, fifteen years' experience in all phases foundry operation. Available February 1, 1954. Address: Box 896, FOUNDRY, Cleveland 13, Ohio.

CLEANING ROOM SUPERINTENDENT

Steel foundry. Available immediately. Twenty years' experience, can handle large or small. Have reputation of keeping up with foundry production. Address: Box 860, FOUNDRY, Cleveland 13, Ohio.

MANAGER OR SUPERINTENDENT

Experienced in gray iron, brass, steel and malleable. Graduate metallurgist with experience in all branches of the foundry. Have held executive position and desirous of position with progressive company. 41 years old. Address: Box 902, FOUNDRY, Cleveland 13, Ohio.

Foundry Services

ATTENTION! FOUNDRY MANAGEMENT

Our experience will give you a head start in shell molding. We provide the only complete shell molding service that offers pilot stage foundry facilities for complete evaluation of your potential. We provide advice on all phases of shell molding, including machine design, plant layout, shell manufacture, shell assembly, shell core manufacture, gating and pouring. This service utilizes competent shell mold experts who draw on actual production shell mold experience in all phases of the process in ferrous and nonferrous alloys.

SHELL MOLD SERVICES
10-12 MARY STREET
NEWARK 5, NEW JERSEY

Engineering Service

ENGINEERING SERVICES
FOUNDRY & MANAGEMENT CONSULTANTS

Cost & Scrap Reduction	Mechanization Surveys
Quality Control	Plant Layout
Process Engineering	Technical Sand Control

CARL E. ROWE & CO., INC.
500 WEST NATIONAL AVENUE
MILWAUKEE, WISCONSIN
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Available Capacity

CONTRACT MANUFACTURING FACILITIES
AVAILABLE FOR
CUSTOM-BUILT
MEDIUM AND HEAVY
MACHINERY

Steel Fabricating Shop—Gray Iron Foundry
Pattern Shop—Machine Shop

OPEN TIME NOW
QUALITY WORKMANSHIP—PROMPT SERVICE

Engineering Service Available

For Complete Information, Write, Wire or Phone

ROBERT HOLMES & BROS., INC.
1-D JUNCTION AVE., DANVILLE, ILLINOIS

Employment Service

SALARIED PERSONNEL

$3,000-$25,000. This reliable service, established 1927, conducts confidential negotiations for high grade men who seek a change of connection under conditions assuring if employed full protection to present position. Send name and address only for details. Personal consultation invited. Address: **JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.**

Employment Service

EMPLOYMENT COUNSEL, INC.

"All The Name Implies"

JOHN COPE, Manager Foundry Dept.

Recruiting men for employers in the foundry industry throughout the nation. Openings in Steel, Malleable, Gray Iron and Non-Ferrous—Jobbing and Production. Salaries to $20,000.

PLANT MANAGERS	SUPERINTENDENTS
GENERAL FOREMEN	MOLD FOREMEN
CORE FOREMEN	MELTING FOREMEN
CLEANING FOREMEN	MAINTENANCE FOREMEN
PATTERN FOREMEN	METALLURGISTS
INDUSTRIAL ENGRS.	TIME STUDY ENGRS.

And all other Administative and Sales Positions

WRITE or CALL for registration.

Completely Confidential.

SUITE 500
CHICAGO 2, ILLINOIS

7 WEST MADISON ST.
FINANCIAL 6-2100

Representatives Wanted

MANUFACTURERS REPRESENTATIVES

To handle a full line of quality electric furnace carbon and alloy steel castings—Crane Wheels, Conveyor Buckets and Chain, Sprockets, Gears and Pinions, Sheaves, Wire Rope Fittings, etc. St. Louis area and states of Kentucky, West Virginia, Southern Illinois, Indiana, Southwest Ohio, Western Michigan, and Central Pennsylvania open.

BOX 872

FOUNDRY **CLEVELAND 13, OHIO**

MANUFACTURERS' AGENTS

To sell special nonferrous alloys on commission basis. Most territories open. Company well established in this field and in most territories can turn over active accounts. Address: Box 835, FOUNDRY, Cleveland 13, Ohio.

WANTED—SALESMAN

Excellent opportunity for energetic man in sales and servicing of super refractory products. Previous selling or plant experience desirable. Position permanent, well established concern. Give complete history and reference. Address: Box 900, FOUNDRY, Cleveland 13, Ohio.

SALES REPRESENTATIVES

Prominent Midwest manufacturer of newly developed foundry equipment for molding and core rooms needs aggressive sales representatives for U.S.A. and Canada. Protected territories—complete advertising assistance. Representatives capable of doing an energetic selling job please reply, including references, experience and lines now handled.

BOX 893

FOUNDRY **CLEVELAND 13, OHIO**

SALESMAN OF FOUNDRY SUPPLIES AND FACINGS

Well established company requires representative for Midwest territory. Must have well rounded foundry experience. In reply state age, experience, salary expected.

BOX 852

FOUNDRY **CLEVELAND 13, OHIO**

WANTED

Sales representatives, core room experience, for Upper New England and New York-New Jersey-Pennsylvania areas. Write in detail giving age, experience, etc. Address: Box 892, FOUNDRY, Cleveland 13, Ohio.

Representatives Wanted

REPRESENTATIVES

We are desirous of obtaining sales representation in the various foundry centers of the United States and Canada for our Nomad Conveyor and foundry equipment on an exclusive basis. Our representative must have the ability to layout conveyor and material handling equipment to be successful in selling it.

WESTOVER ENGINEERS
EQUIPMENT DIVISION
3110 W. FOND DU LAC AVE.
MILWAUKEE 10, WISCONSIN

Wanted-To-Buy

WANTED

STEEL SHOT & GRIT

ANY GRADES—ANY SIZES

BEMCO COMPANY
511 FREEMAN **CINCINNATI 3, O.**

WANT TO BUY

Always in the market for surplus used foundry equipment. Contact us before selling. Interested especially in complete plants. Will go anywhere.

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 E. BROAD ST.
SHILLINGTON, PA.
PHONE: READING 7-1321

WANTED

Mechanized foundry located in the East. Must be reasonably priced.

BOX 880

FOUNDRY **CLEVELAND 13, OHIO**

WANTED

Will rent medium sized gray iron production foundry in Eastern Pennsylvania, with option to purchase.

BOX 879

FOUNDRY **CLEVELAND 13, OHIO**

PERIODICALS

Wanted to buy for cash. Back volumes and sets of Transactions Am. Foundrymen's Society and other scientific and technical Journals. Address **ASHLEY, 24 EAST 21, NEW YORK 10, NEW YORK.**

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address Box 578, FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

WANTED
ROOTS-CONNERSVILLE
POSITIVE BLOWERS

GREENE BROTHERS
511 FREEMAN CINCINNATI 3, O.
PHONE: MAin 2192

WANTED

One used Swing Grinder in good condition.

BOX 899
FOUNDRY CLEVELAND 13, OHIO

WANTED TO BUY

Profitable gray iron foundry located in Middle West producing squeezer or light roll-over castings. Equipment and business only. No real estate.

BOX 910
FOUNDRY CLEVELAND 13, OHIO

WANTED

1—Hough Payloader.
1—No. 2 Simpson Mill.
1—No. 3 Simpson Mill.
2—S.P.O. pin lift molding machines. Portable type.
1—American 36 x 42 wheelabrator.

MARCH-BROWNBACK CO., INC.
POTTSTOWN, PENNSYLVANIA

MACHINERY WANTED

Induction Furnaces, Screens, Simpson Mixers, Riehle Compression Testing Machines, Pulverizers, Grinders, Conveyors. Address: **P.O. BOX 1351, CHURCH STREET STATION, NEW YORK 8, NEW YORK.**

WANTED TO BUY

Dust collector with fan and motor operated shaker, 2500 to 3000 C.F.M. 6" S.P.W.G. maximum. Address: **ARMATURE WINDING CO., BOX 1148, CHARLOTTE, N. C.**

Foundries For Sale

FOR SALE OR LEASE
GRAY IRON—ALUMINUM—BRONZE
FOUNDRY

17,000 square-foot building is 80' x 210' on 5 acres with railroad spur. Complete with modern production equipment. Six-ton capacity cupola—200 tons per month. Present owner can use 25% to 50% of production. Selling to concentrate on primary business of manufacturing. Immediate occupancy.

CONTACT:
FRANK WHEATLEY, JR.
FRANK WHEATLEY PUMP & VALVE MFR.
HALE STATION, SAND SPRINGS ROAD
TULSA, OKLAHOMA

FOR SALE

Well equipped gray iron foundry in Southern Massachusetts. Ten tons per day capacity. Good buy for working partners.

BOX 917
FOUNDRY CLEVELAND 13, OHIO

FOR SALE

Brick and steel foundry, Southern Illinois, 160 x 320 feet, overhead monorail water transportation available. Ideal for mechanized operation, contains equipment. Address: Box 702, FOUNDRY, Cleveland 13, Ohio.

Foundries For Sale

PLANT
FOR SALE

34,921 sq. ft. of industrial floor space on 1.983 acre land on main highway and main line railroad in metropolitan Birmingham, Alabama—the finest industrial location in the South. Two main buildings (30,942 sq. ft.) with ample storage space, 4 cranes (two 5-ton, two 10-ton), and blacksmith shop. New modern air-conditioned office building (1213 sq. ft.). Carpenter shop (1218 sq. ft.). Bath house (1548 sq. ft.). Steel and masonry construction—interiors and exteriors in excellent condition. Gas heat. Unlimited water supply. Railroad siding. Ample skilled labor (majority homeowners) in immediate area. Write for detailed information.

ENGEL REALTY COMPANY
1921 FIRST AVE., N. BIRMINGHAM, ALA.

FOR SALE

Nonferrous metal foundry business, fully equipped plant and building on 100 x 100 ft. lot. Established over 30 years. Volume over $200,000. In New York metropolitan area. Will consider active partner for 50% interest.

BOX 911
FOUNDRY CLEVELAND 13, OHIO

SMALL FOUNDRY FOR SALE

On New York Central Railroad side track in Lockport, New York. Floor space of molders approximately 11,000 square feet with exceptional dumping ground for disposal of slag and waste indefinitely at lowest expense over declivity on the land. Considerable foundry equipment thrown in for the price of assessed value of the real estate. Address: JEFFERSON UNION COMPANY, LOCKPORT, NEW YORK.

For Sale

TESTING MACHINES

1—Riehle 400,000# hydraulic and beam type Compression Testing Machine
1—Riehle 200,000# Universal
2—Riehle 100,000# Universal
1—T. Olson 100,000#
Also Simpson Sand Mixers 18" dia. Laboratory, #0, #1, #1½, #2, #3
Miscellaneous: Screens, Pulverizers, Grinders, Conveyors—all types, Tyler Rotap Screens, etc.
OUR 36th YEAR

CONSOLIDATED PRODUCTS CO., INC.
OBSERVER HIGHWAY & BLOOMFIELD ST.
HOBOKEN, N. J.
HO 3-4425 N.Y. TEL. BA 7-0600

FOR SALE
DETROIT ELECTRIC FURNACE

Type AA of 1,200 lb. cold metal or 2,600 lb. hot metal capacity, complete with mechanical and electrical equipment for melting and rocking, including oil filled transformer of 11,000 v. primary and 125 v. secondary. Presently crated but available for inspection on 48 hours notice. Ideal for high test cast irons, brasses or bronzes. Price: $9,500.00. Address: **HOPE ELECTRICAL PRODUCTS CO., 338 WILSON AVENUE, NEWARK 5, N. J.**

PATTERN EQUIPMENT FOR SALE

First quality aluminum patterns for 4" medium soil pipe fittings. Also complete set of aluminum patterns for waterless aluminum utensils. Address: **ST. JEROME INDUSTRIES LTD., CASTONGUAY ST. WEST, ST. JEROME (TERREBONNE) QUE., CANADA, TEL: 3767.**

FOR SALE

One cupola 48" O.D., complete with the lining, blower, and other miscellaneous foundry equipment, for $2,000.00. This equipment may be inspected at our plant. Address: **MATT G. REEVES & SONS, INC., 122 SOUTH 12th STREET, TAMPA, FLORIDA.**

FURNACES FOR SALE

Ten used heat treating furnaces and two seven ton gantry cranes. Good condition. Priced to sell. Address: **BAER STEEL PRODUCTS, INC., BOX 1428, BOISE, IDAHO.**

For Sale

FOR SALE
CORE BLOWERS

#91 Osborn—for small cores	$650.00
#193-4 Osborn—for medium cores	$1250.00
#94 Osborn—for large cores	$2000.00

FORK LIFT TRUCKS

15,000 lbs. Hyster Fork Lift Trucks	$4000.00
6,000 lb. Clark Fork Lift Trucks	$1200.00

MOLDING MACHINES

Herman Jar Rollover and Pattern Draw Machine; new in 1944; 48" x 144"—10,000# Series, Rollover Ser. #1812; solid cylinder jolt machine, Ser. #4167; ready discharge roller conveyor complete; No. 4 (1½") Electro Pneumatic Timing Device 115 volts, 60 cycles; 2 sets 6000# Pneumatic Flask Clamps complete with special holders (Like New Condition)	$9500.00
Herman Jar Rollover & Pattern Draw machine 80" cap.; 6000# Series	$1500.00
30" x 36"—#1500 Series Hi-Speed Herman Pneumatic Jar Rollover and Pattern Drawing devices with 26" x 30" plate—8½ cylinder jarring molding machine; 16" draw; max. flask size is 36" long; 30" wide; 16" high	$1500.00
International JDP Pattern Draw Machine—600 lb. cap.; 8" draw; on wheels	$475.00
#2047-3 Osborn Jolt Rollover Pattern Draw molding machines	$275.00
#601-13 Osborn Jolt Rollover Pattern Draw molding machines	$275.00
#413-3 Osborn Jolt Rollover Pattern Draw molding machine; 130" x 42"	$5000.00
#275J Osborn Jolt Squeezers	$125.00
#914 SPO Jolt Rollover	$275.00

WHEELABRATORS

20" x 27" American Wheelabrator	$1500.00
27" x 36" American Wheelabrator	$2000.00
48" x 48" American Wheelabrator	OFFER

MISCELLANEOUS

#2 Simpson Muller	$1500.00
#2 Climax Wire Straightener	$250.00
Marschke Swing Frame Grinder—10 HP	$550.00
#7 Cupola. Still in crate	OFFER
#6 Whiting Cupola Blower	$550.00
Beardsley & Piper Tractor Type Sandslinger with magnetic tower—13' arm	$5500.00
Strohman Aluminum Furnace — reverberatory type; 1200 lb. cap.; gas fired; with skip hoist and hydraulic tilting equipment	$1500.00

FOR THE BEST DEAL
CALL
BALCHER MACHINERY COMPANY
1884 S. COMPTON ROAD
CLEVELAND HEIGHTS 18, OHIO
TELEPHONE: FAIRMOUNT 1-1186

BRASS MELTING FURNACE

"Reda", for sale, 550# capacity, gas or oil, with extra set of refractory lining. Unit used less than 30 days, excellent condition. Wire your best offer.

RED JACKET MFG. CO.
DAVENPORT, IOWA

FOR SALE

1—American A.M. sand cutter—50 inch cutting wheel, excellent condition.

NARRAGANSETT FOUNDRY
130 WEST RIVER STREET
PROVIDENCE, RHODE ISLAND

FOR SALE
MOLDING MACHINES

16 Osborn 212 P J 18 x 28 Table
4 Osborn 712 P S 18 x 28 Table

Automatic squeeze pressure release valves. Good condition—Reasonable.

NATIONAL MALLEABLE & STEEL CASTINGS CO.
546 NORTH HOLMES AVENUE
INDIANAPOLIS 6, INDIANA

FOR SALE

Sand cutter, Model M, manufactured by American Wheelabrator & Equipment Company, Serial No. 310. Cutting cylinder 70" wide, wheel diameter 56". Driven and operated with four electric motors, 220/440 volts, 3 phase, 60 cycles. In excellent condition, and a real value. Address: **OHIO STOVE COMPANY, PORTSMOUTH, OHIO.**

FOR SALE

One Osborn core blowing machine model #91, Serial #12269G. If interested contact or write: **CLINTON MACHINE CO., MAQUOKETA, IOWA.**

FOR SALE

One #2 Redford Core Blower—Never used. Price $500.00. Address: **NATIONAL PLUMBING FIXTURE CORP. ELLWOOD CITY, PA.**

FOUNDRY EQUIPMENT
MOLDING MACHINES

1—Herman Jolt Rollover #6000, 40" x 60"—late.
2—Herman Jolt Strippers, 48" x 54"—late.
1—Osborn 405 Rollover with Roll Out Car.
1—Osborn 332 Jolt Rollover.
3—SPO 110J Squeezers.
2—Osborn 275J Squeezers.
1—Osborn 75J Squeezer.
8—Tabor Split Pattern Squeezers.
5—Haynes Squeezers.
1—Milwaukee Squeezer.
2—Adams 12 x 38 Squeezers.
29—Osborn 2047-4 Jolt & Draw.
1—Tabor 31 x 40 Rollover—portable.
2—Int'l 24 x 30 Rollovers—portable.

SAND HANDLING EQUIPMENT

#2 Simpson Muller.
#3 Simpson Muller.
2—50" Dia. Single Wheel Simpson Mullers—Belt.
B & P Mulbaro.
2—Jeffrey Sanditioners.
18", 24", 36" Belt Conveyors, 10' to 150' Centers.
Unit A Syntron Feeder Hopper, 6' x 6'.
2—Aerators, Overshot type, 9' x 2' x 4' x 3'.
Aetna Sperser System.
Simplicity Shaker, model C.

CRANES & HOISTS

Curtis Traveling Bridges, 15' span.
Curtis Air Hoists, 4" to 15" dia.
Electrified Monorail.
Elec. Hoists, ⅛ ton to 3 ton.
Air Hoists, to 3 ton.

BLOWERS

10,000 CFM @ 48 oz., Spencer Turbo.
6350 CFM @ 32 oz., Ingersoll Rand.
3900 CFM @ 20 oz., Whiting.
3500 CFM @ 40 oz., Spencer Turbo.
3600 CFM @ 16 oz., No. American.
2250 CFM @ 16 oz., Spencer Turbo.
1900 CFM @ 8 oz., No. American.
Roots-Connersville Blowers—any size.

MISCELLANEOUS

14' dia. Pangborn Tablast.
15,000 CFM Dust Collector.
10,000' 458 Conveyor Chain & Trolleys.
Schramm 25 HP Air Compressor.
30" Modern Pouring Devices.
12—Combs 20" Gyratory Riddles.
1500' Hevi Duty 10" Roller Conveyor, 2½" dia.
300' Hevi Duty 10" Roller Conveyor, 3½" dia.
Chaplets—all types.
30# & 50# Mold Weights.
2—#9 Whiting Cupolas.
Geared Ladles—to 10 tons.
Redford Bench Type Core Blower.
2—Int'l SB11 Core Blowers.
Demmler #1 Core Blower.
Champion Core Blower, model CB400, 300 lb.
Brinell-Rockwell-Riehle Testers.
1—12 x 12 Pangborn Sand Blast Room, with Dust Collector.
1—400# Detroit Electric Furnace.
2—6000# Automatic Transporters.
Baker Lift Truck, 6000# cap., 1948.
Yale Lo Lift, Redi power.
Logan Wood Slat Conveyor, motorized, 36" x 35'.
15—Double End Grinders.
#124 Gardner 53 Horiz. Grinder.
1—Standard Buffer & Polisher—late.
Tons of Flasks.
Perforated Steel Core Plates.
1—Roto-Clone unit, 24W, with Sludge Ejector.
2—48 x 72 Jeffrey Vibrator Feeders.
Vibrators, Osborn, 1⅝" & 2".
1—McLeod Tumbling Barrel.
4—Whiting 30 x 60 Tumbling Barrels—late.
2—Sand Cutters, model M.
Bottom Dump, Sand Buggies.

WE WILL BUY—FROM 1 PIECE UP TO

ENTIRE FOUNDRY
GREENE BROTHERS
(FORMERLY ASSOCIATED WITH
ALLIED MATERIALS HANDLING CO.)
511 FREEMAN CINCINNATI 3, OHIO
PHONE: MAIN 2192.

For Sale

FOR SALE

MOLDING MACHINES
2—No. 275 Osborn jolt squeezers.
2—Deuscher Stationary jolt squeeze.
2—SPO #611B Stationary Oscillating Jolt Squeeze Strippers.
4—#610 Johnston & Jennings Air Jolt Rollover Draw Portable 24 x 30 table.
1—Tabor 36 x 50 table Air Jolt Rollover Draw, 3000# capacity.
1—Tabor Pedestal Core Rollover Hand Ram Rollover Draw 14 x 20 table 8" draw.

BLOWERS FOR CUPOLAS AND FURNACES
2—15 HP Spencer-Turbine 2250 CFM at 16 oz.
10—High temperature blowers 1400° F. 9000 to 15000 C.F.M.
2—#7½ Roots rotary blowers—27 x 81—14000 CFM.
1—Connersville rotary blower 22 x 66 45 cu. ft. per revolution 9000 CFM.
Maxon-Premix Blowers for Gas ¼ to 1 HP.
2—5 HP 20-oz. Spencer Turbine Blowers.
2—2 HP 20-oz. Spencer Turbine Blowers.

METAL MELTING EQUIPMENT
1—1000# open flame brass melting furnaces, gas fired.
1—Hausfeld Stationary Brass, Multiple gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas, 250# Al Cap.
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired.
New 32" to 41" dia. shell cupolas made to order.
New 1000 lb. aluminum cap. tilting crucible furnaces to specifications.

MISCELLANEOUS
1—Beardsley & Piper, Model S Screenerator.
1—Simplicity Model B Sand Conditioning Unit, 4' x 8' double deck screens with aerator for piling.
1—Stoney crane type shakeout.
1—NC-4 Royer sand separator.
1—#1 Demmler core blower.
2—#16 Roto-clone units complete.
1—McLeod Small Sand Blast Barrel 24 x 24.
1—NB-2 Royer.
1—30 x 48 tumbling mill.
1—36 x 48 tumbling mill.
1—Nat'l. Eng. skip hoist.
Complete stock of rebuilt mill and dust exhaust blowers.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

MISCELLANEOUS EQUIPMENT

Chip dryer, 22' long x 3' dia. "Fabricated Steel" Compl.
Grinder, ped. type, double end, Vonnegut-Marchke type J2aVHM 31280 w/10 hp D.C. motor.
6—Grinders, ped. type, double end, Vonnegut-Marchke, 10 HP D.C. Complete.
Grinder, snag, ped. type, 1 wheel less motor & drive.
3—Flexible shaft grinders, Keller, on pedestal base, w/ fractional HP motor.
Ball Mill, Marcy #54 complete.
Metal Crusher, New-Century.
Magnetic Separator, Dings portable 15" x 36" w/ 3 HP motor less motor gen. set.
Molding Machine, 36" plain jar power draw Tabor.
Sand Blast Tank, Sly 30" h x 2½" dia.
Vapor Blast, (used) #20-B Junior complete w/ cabinet, 2 motors and controls.
Sand Mixer, Simpson complete w/600# core muller, bucket loader, motors & controls.
Magnetic Separator, Dings 24" w/3 HP motor & speed reducer less motor gen. set.
Sifter, #12 Speedy Foundry Supply Mfg. Co.
Wire Cutting Machine, Lewis #7 w/½ HP motor.
Wire Straightener "Climax" #2A compl. w/ controls & 1 HP motor.

BOHN ALUMINUM & BRASS CORP.
DETROIT 26, MICHIGAN

FOR SALE

Whiting Cupola, #6B. Serial 5730, Lined to 48".
Roots-Connersville Blower. 16x42. Serial 17343, 50 H.P. 1200 Motor, 3 Ph, 440 V, 60 c.
Foxboro Air Weight Controller, M10. Serial F 51786.
Jeffrey Apron Conveyor. Serial 1237420.
American 8' Rotary Cleaning Table with Pangborn gut blast machine, #AU11, No. DVR7, Seperator and No. IC3 Elevator.
2 American Sandcutters. Model D-1, #D641 and Model M-89/70, No. M267.
Whiting Cupola, #8.
2 Roots-Connersville Cupola blowers with V-Belt drive, 50 HP motors and Foxboro air weight controllers #M10-F39645.

HOLLAND FURNACE COMPANY
HOLLAND MICHIGAN

For Sale

CALL US COLLECT FOR YOUR REQUIREMENTS ON:

MOLDING MACHINES
Osborn, Milwaukee, International, Spo, Herman or Specials.

MULLERS

Simpson, Beardsley & Piper

SHOT BLAST EQUIPMENT

Pangborn, American Wheelabrator

SAND CONDITIONING EQUIPMENT

Royer, Beardsley & Piper, American Wheelabrator

SAND HANDLING SYSTEMS

GRINDERS

ELEVATORS

AIR COMPRESSORS

HOISTS

SHAKEOUTS

CORE OVENS

FURNACES

We also **BARTER** to give you what you want for your Surplus.

ALL EQUIPMENT SUBJECT TO RETURN IF UNSATISFACTORY.

LAND-WHITEHEAD EQUIPMENT CORP.
FOUNDRY MACHINERY SPECIALISTS
P.O. BOX 939 READING, PA.
PHONE: 5-4379

FOR SALE

MOLDING MACHINES
10—SPO 110J Portable Jolt Squeezers. Never Used.
2—Tabor Power Rollovers, 30 x 40" table, portable.
4—Milwaukee Jolt Rollovers, 30 x 48" table.
3—Milwaukee Jolt Strippers, 32 x 38" table.
10—Osborn 275J Portable Jolt Squeezers.
4—Herman Rollovers tables, 60 x 80" and 40 x 60".
16—Davenport Rollovers & Jolt Strippers.
20—Osborn Rollovers & Jolt Strippers.
6—Core Blowers. All sizes.
FURNACES
2—Fisher Tilting 400 & 225 Crucibles.
5—Campbell Hausfeld Tilting 2—#150, 3—#275 crucibles.
2—Bailey Arc Electric Furnaces, 75 KW, 800# Brass.
2—Hausfeld 1200# magnesium tilting.
6—Stationary Hausfeld gas fired furnaces, #70.
1—Ajax Induction Aluminum Furnace, 400# capacity.
3—Walker-York 400 crucible coke tilting furnaces.
1—#8 Whiting Cupola complete with GE Blowers.
1—#0 Whiting Cupolette with blower.
MISCELLANEOUS
14—Core Ovens, gas & electric, all types.
Ladles, 10 ton to 1000# capacity.
Complete mechanized system of Maytag Company, Newton, Iowa, for sale as a unit or piecemeal.
2—#920 Clearfield Mixers with 60 HP motors.
1—#2 Simpson Mixer with skip hoist.
9—Sand Belt Conveyors. 2—Elevators.
2—4 x 8 Simplicity Shakeouts.
1—#3 Simpson Mixer.
1—40 HP Sullivan Air Compressor.
250 Tons of Steel Flasks. Send for listings.

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 E. BROAD STREET
SHILLINGTON, PA.
PHONE READING 7-1321

FOR SALE

Model #92 Osborn Core Blower, air clamped. Equipped with 2 blow-heads: 1—22" x 12" sand reservoir blow plate surface, 11" sand reservoir; 1—12" x 10" sand reservoir blow plate surface, 12½" sand reservoir.

DUPLEX MFG. & FOUNDRY CO.
398 W. RIVER STREET
ELYRIA, OHIO
PHONE: 2353

MOLDING MACHINES

1—**HERMAN PNEUMATIC** 40" x 60", 15" Solid Cylinder Jarring Molding Machine, Heavy duty Bumper Type.
5—**S P O** No. 110J Portable Jolt Squeeze Machines, 1952 machines.
1—**S P O** No. 507 Rollover, Jolt Pattern Draw.
6—**OSBORN** #275J, Jolt Squeeze Machines, portable & stationary models.
1—**OSBORN** #710PJ, Jolt, Squeeze, Pin Lift.
10—**OSBORN** #559 HD Jolt Strippers, stationary, Table 25" x 30", Jolt 1200 lbs.
1—**OSBORN** #333 H Jolt, Squeeze, Power Rollover, Pattern Draw, 2000 lbs., Jolt, 22" x 44" Table Jolt Cyl. 12", Draw 22".
2—**OSBORN** #332 Jolt, Squeeze, Rollover, Pattern Draw, Draw 9", Flask 25" x 36".
5—**OSBORN** #601-13, Jolt, Rollover, Pattern Draw, 600 lbs. cap., Flask Length 30".
2—**OSBORN** #142 Jolt, Rollover, Foot Draw.
2—**OSBORN** #331 Jolt Rollover, Squeeze and Pattern Draw, Squeeze cylinder Diameter 13", Table Length 30".
6—**OSBORN** Jolt Squeezers #75J.
1—**JOHNSTON & JENNINGS** Model 918, Jolt Rollover and Pattern Draw, Table Size 44" x 54", 20" Draw.
1—**JOHNSTON & JENNINGS** Jolt Squeeze.
2—**JOHNSTON & JENNINGS** #815, Jolt Rollover and Pattern Draw, Table 30" x 40", Pattern Draw 15". Cap. 1200 lbs.
1—**JOHNSTON & JENNINGS** Model 812S Stationary Jolt Pin Lift, table size 30" x 38", Draw 12" Capacity 1600 lbs.
1—**JOHNSTON & JENNINGS** Model 1216S Stationary Jolt Pin Lift, table size 36" x 54", Draw 16", Capacity 3000 lbs.
1—**JOHNSTON & JENNINGS** Air Jolt Machine, 14" x 20" table size, 3" cylinder.
3—**INTERNATIONAL** Model PKL, Jolt, Squeeze, Air Pin Lift Machines, 18" x 24" Table, Lift 5½", Squeeze Cylinder, 12".
5—**INTERNATIONAL** Type "R" Hand Ram, Hand Turnover, Foot Draw Machines.
2—**INTERNATIONAL** Type "RJ" Jolt Ram, Hand Turnover, Foot or Hand Lever Draw Machines. Various Sizes.
3—**INTERNATIONAL** Type JFL, Jolt Ram, Foot Lever, Pin Lift, Various Sizes.
4—**INTERNATIONAL** Type G, Air Jolt, Air Turnover Foot Draw Machine, 20" x 8", 24 x 8, 30 x 8".
1—**INTERNATIONAL** Type LJSD—14, Jolt Squeezer—Double Squeeze Head, 16" x 20" table.
1—**CHAMPION** JS-10-P. Jolt Squeezer, Portable, Serial #5770, Table Size 18" x 26".
1—**CHAMPION** Model #JM 16, Serial #5092, Power Jolt, Hand Turnover, Foot Draw Machine, 13" x 17" table.
2—**DAVENPORT** Model SA-34, Jolt Rollover and Pattern Draw, 2500# Jolt Cap., 15" Draw, 34" x 48" Table.
1—**DAVENPORT** Model 28, Jolt Rollover, and Pattern Draw, 1500# Jolt Cap., 12" Draw, 30" x 40" Table.
2—**TABOR** Jolt Rollover and Pattern Draw, Draw 10", 600 lbs. Cap., 22" x 42" Table.
2—**TABOR,** Hand Rollover, Hand Jolt Machines.
1—**TABOR** Jolt Rollover Pattern Draw, 30" x 40" Table, Draw 12", cap. 1000 lbs.
3—**MILWAUKEE** Model 123-13, Jolt, Squeeze, Machines, 12" cylinder, 17" x 26" table.

GRINDING EQUIPMENT

2—**FOX** No. 3-A High Speed Stand Grinder. Wheel size 20" x 2" x 10", 5 H.P. motor.
1—**HAMMOND** Model WR-i Double End Snagging Grinder, 7½ H.P., 220/440/3/60.
2—**HAMMOND** Model WH-10 Double End Grinders with (2) 7½ H.P. 220/440 3 phase, 60 cycle, wheel size 20" x 2" x 2".
1—**QUEEN CITY** Model 100 Double End Disc Grinder with 10 H.P. 220/440 Volt Motor, Size 20" x 2" x 2", Very Late Machine.

SAND EQUIPMENT

1—**BEARDSLEY & PIPER** Model "S" Screenerator, Pneumatic Tires.
1—**BEARDSLEY & PIPER** Model L Screenerator, on pneumatic tires, Portable.
1—**BEARDSLEY & PIPER** Sand Conditioner, complete with magnetic separator, 20 H.P. totally enclosed motor, overhead hopper, largest model made. Serial Number SC-73, 1945 machine.
1—**ROYER** Model NB-2 Sand Conditioner, portable, 7 to 9½ tons per hour.
1—**ROYER** Model NC-4 Sand Conditioner, portable, 12 to 15 tons per hour.
1—**ROYER** Model C-2 Sand Conditioner, portable, 25 to 30 tons per hour.
1—**JEFFREY** Type "P" Sand Conditioner, Class B Mixer, Portable, Serial #377.
1—**AMERICAN** Sand Cutter, Model AM, Size 69 x 45, Serial #152.

OIL FIRED CONVERSION EQUIPMENT

1—Oil-fired Hauck Burner No. 781, complete w.th controls, air heater.

MELTING FURNACES

3—**FISHER** Model MNP Tilting Furnaces, 2000 lbs capacity in Aluminum, 1500 lbs, for magnesium, complete with NEW POTS, blowers, and electrical tilting mechanism. Offered at TREMENDOUS SAVINGS.
5—,00 lb capacity Holding Furnaces, newly bricked.
1—Holding Furnace, 300 lbs. Cap.
1—**HAUSFELD,** Tilting Furnace, 500 lbs. Cap. Nose Pouring.
5—**FISHER** Model MNP 1000 lbs. Capacity, For Aluminum.

HEAT TREAT FURNACES

1—**ECLIPSE** Gas Fired Furnace, 4 burners, 18" x 20" x 60" inside dimensions, with motors and blower, 1944 Machine.
1—**AMERICAN** Gas Furnace Model DC, 10" x 16" x 26" inside dimensions, 1600 degrees to 2350 degrees F.
1—**YOUNG** (3) Compartment Pull Drawer Oven, FOR MAGNESIUM, each compartment 6'6" wide x 5'9" deep, x 7' high inside (3) Drawers to compartment. Electric heating for temperature of 800°. FOR HEAT TREATING, DRAWING OR STRESS RELIEVING.

MULLERS

1—**SIMPSON** #2 Sand Muller. Complete with motor & drive. Open Gear Type.
1—**B & P** Mullbaro #3½ with 4 Barrows.
1—**SIMPSON** #3 Sand Muller, Open Gear Type.
2—**BEARDSLEY & PIPER** #70 Speed Mullers.

CORE OVENS

1—**COLEMAN** Core Oven, gas fired, 4 doors opening into single compartment, 42" wide, 50" high, and 31" deep, adjustable trays on 3" centers.
1—**COLEMAN** Core Oven, Gas Fired, 15' x 10' x 8', drawer type.

CORE BLOWERS

1—**OSBORN** #91 Core Blower, Serial 10050.
2—**OSBORN** #92 Core Blowers, Serial #9703A & 8692-C. Air Clamps.
1—**DEMMLER,** #1-E Core Blower. Ser. #3287. Equipped with Air Clamps, 1950 Machine.
1—**DEMMLER** #3—E Core Blower.
1—**DEMMLER** #2 Core Blower, Air Clamps.
2—**REDFORD** Core Blower No. 1, Cartridge Bench Type.

SAND BLASTING EQUIPMENT

1—**AMERICAN WHEELABRATOR** Tumblast, 36 x 42, with Skip Hoist & Shot Return. Serial No. A-37913.
1—**AMERICAN WHEELABRATOR** Table Blast, 8' with 8—24" Tables. Equipped with Shot Return & Dust Collectors.
1—**AMERICAN WHEELABRATOR** Table Blast, 4' Table, Model BM 6350, Ser. No. A 40579.
1—**SLY** Tumbling Barrel 48" x 75"—¾" Plate, Dry or Wet, Equipped for Dust Collector.
1—**NEW HAVEN** Air Blast Barrel 48" x 42", Equipped with Motor & Drive, 1942 unit.
1—**PANGBORN** Air Blast Cabinet, Model EN2, Size 5' x 3' x 7'1" high, with Dust Collector.
1—Tumbling Barrel 28" diameter, 40" long, equipped with Motor, Speed Reducer.

LADLES AND POURING DEVICES

3—Modern Pouring Device, Model "F". Ladle Hoists, with 15" Taper Covered Ladles. 500 lbs. capacity, with Hand Tilting Devices.
1—**WHITING** 1-Ton Gear Enclosed Tilting, 27" diameter.
1—**WHITING** Ladle 20 tons, tilting, totally enclosed gearing, nose pouring.
1—**WHITING** Ladle, 2 tons, tilting, totally enclosed gearing, nose pouring.

CONVEYORS—Apron • Roller • Belt

1—**FARQUAR** 167' x 24" Trough Conveyor, 375' of 5 ply belting.
1—**GODFREY** 18" x 19' Under Car Unloader, with 3 H.P. Motor, Steel Belt.
1—18" x 24' Apron Conveyor, Steel Link Belt, complete with motor and drive.
1—24" x 20' Apron Conveyor, Steel Link Belt.—Less motor and drive.
700' of **MATHEWS** Roller Conveyor, Above Rail 20" wide, 2½" Rollers, on 4" Centers.
300' of **MATHEWS** Roller Conveyor, Above Rail 24" Wide, 2¾" Rollers.
200' of Heavy Duty Roller Conveyor 30" wide, 3" Rollers on 6" centers, ⅞" shaft, 4" Channel, Rollers above rail.
200' of Roller Conveyor 8" wide, 2" Rollers, above rail.
100' of Roller Conveyor 14" wide, 2" Rollers, above rail.

AIR HOISTS

2—**INGERSOLL RAND,** Size D, 4000 lbs. Late type Air Hoists complete with Trolleys.
2—**INGERSOLL RAND,** Size B 1000 lbs. Late type Air Hoist, complete with Trolleys.
1—**INGERSOLL RAND,** Size C, 2000 lbs. cap.
1—**LITTLE GIANT,** Model A, 1000 lbs. cap.
4—**THOR** Pneumatic, 1000 lbs. cap. low head room.

SHAKEOUTS

SIMPLICITY Shakeouts, 3' x 3', Serial #33—SOS—106, Model S, 1000 lbs, Cap.
1—**SIMPLICITY** Shakeout, 4' x 6', Model D, 16,000 lbs. cap., 10 H.P. Motor.
1—**SIMPLICITY** Shakeout, 5' x 7', Serial #57—SOBG—185, Model BG, 5000 lbs. Cap.
1—**SIMPLICITY** Shakeout, 4' x 6', Serial #46—SOB—145, Model B.
2—**SIMPLICITY** Shakeouts, 4' x 8', Serial #48—SODE 104, Model DE, 16,000 lbs. cap.
1—**ROBBINS** 4' x 10', Floatex Model, Serial F-609, 7½ H.P. motor & V-belt Drive.

LIFT TRUCKS

2—**BAKER RAULANG** Electric Fork, 4000 lbs. cap., 119" lift. Like New!
1—Automatic Platform Lift Truck, 3000 lbs cap. lift 6', battery operated.
5—**LEWIS SHEPARD** 4000 lbs. cap., Jack Lift Trucks, hydraulic, 1950 models, 28" x 40", will take 10", 11" or 12" skid.
1—Automatic 10,000 lbs. platform Low Lift with Ready Power Unit.
5—**EDISON,** 24 Cell Nickel Batteries.

ELECTRIC HOISTS

1—Shaw Box Load Lifter, 4000 lbs cap., 220/440. Never used.
1—Electro-Lift Hoist 3,000 lbs. cap., 25' Lift.
2—**YALE & TOWNE,** 2000 lbs. Hoists (Cupola) #7E.

BLOWERS

1—**BUFFALO FORGE** Blower, 40 H.P. 3600 rpm. 220/440.
1—**NORTH AMERICAN,** 7½ H.P., 16 oz. 1050 c.f.m. NEVER USED.
5—Assorted Blowers for Furnaces. 2-3-5 H.P., 16 oz.
1—**NORTH AMERICAN** Turbine Blower, 24 oz., 1900 c.f.m., with 20 H.P.

MISCELLANEOUS

1—**INGERSOLL RAND** Air Wrench. Size MHO.
1—**SCHMEIG** Spark Arrestor.
1—**READY POWER** Unit, 4 cylinder, 36 volts.
2—**READY POWER** Units, 6 cylinders, 36 and 48 volts.
1—**RIEHLE** Tester, 100,000 lbs. cap. Screw type.
1—**RIEHLE** Tester, 150,000 lbs. cap. Screw type.
3—Electric Riddles, 21" diameter, ¼ H.P. Motor, 110 volts.
1—**CLIMAX** Wire Straightener #2.
2—Cyntrons Vibra Flow Feeders, Type F 210, Style 1538.
3—**LEEDS & NORTHRUP** Model "S" Micromax.
1—Cupola Lighter, Tank & Torch.

SCALES

1—**HOWE,** Weightograph 6000 lbs. cap. 4' x 5' Platform.
1—**FAIRBANKS MORSE,** 6000 lbs cap. 4' x 5' Platform. Open Dial.

Always in the Market for Used Foundry Equipment, One Piece Or a Complete Foundry.

A.A.A.

MACHINERY & EQUIPMENT CO.

856 EDDY ROAD—CLEVELAND 8, OHIO

Phone: Liberty 1-6545

(Licensed Auctioneers, Specializing in Foundry Liquidations)

Hines, Adams & Fremont Flasks & Jackets, Both Pop-Off & Slip. Send for Flask & Equipment Listings.

Electric Melting Furnaces

A large company discontinued its steel foundry—we bought the furnaces.

ELECTROMELT TYPE C Side Charge, 2 ton per hour rated capacity. 7000# to 8000# usual heats. Can handle 16,000# heats. Late type transformers. 1200 KVA, 13,200 volt primary. Complete with all controls.

DETROIT ELECTRIC, 1200# capacity, 13,200 primary voltage. Kuhlman transformers. Complete with controls.

DETROIT ELECTRIC 350#, Type LFA with Kuhlman transformers and oil circuit breaker.

The two larger units may be seen in place.

ACME EQUIPMENT CO., INC., 126 South Clinton Street, Chicago 6, Illinois, Phone: Andover 3-3430.

FOR SALE

AIR COMPRESSOR

Ingersoll Rand Type 10—14 x 9 x 12, 2 stage, 75 HP, 3/60/220/1200 rpm synchronous motor, 350 CFM at 100#.

BLOWERS

Spencer Turbo Blower, 2250 CFM at 16 oz. 15 HP 3/60/220 totally enclosed motor. New 1947.

Ingersoll Rand Motor Blower Type FS. Single Stage 4000 CFM @ 3.75 PSI, 100 HP, 220 V. G.E. Induction Motor.

Buffalo 7E Direct Connected Blower, 50 HP Westinghouse motor, 3/60/220-440 V, 3535 rpm, 28" wheel, 3500-4000 CFM at 32 oz. Flanged outlet.

Spencer Turbo Blower. New 1949. 3500 cfm, 28 oz. with 40 HP 220-440 motor and Foxboro controls.

CONVERTER

100 KW Rotary Westinghouse 220 V 60 cycle primary 250 V DC, complete with controller and panel.

CORE BLOWER

Demmler #3E Dropaway Draw. New 1946.

Demmler #35.

CRANES

5 Ton P & H Overhead Elec. Traveling Crane, 30'6" span, 15' lift (can be increased) 3 motor, 220 V A.C. New 1946.

5 Ton P & H Overhead Electric 20'5" span, electric hoist, hand travel both ways, P/B control 440 V A.C.

10 Ton Northern Overhead Elec. Traveling Crane, double girder, fish belly, 3 motors, 230 V D.C., 54'7½" wide C to C of wheels can be cut down to fit smaller size.

CRUSHERS—PULVERIZERS

2—Stedman 15" x 12" Type A. One with 10 HP 220-440 V motor. One without motor.

7—Prater Blue Streak Pulverizers, 30 HP motor.

CUPOLA CHARGER HOIST

Cupola Charger Hoist with 5 Hp Star 220-440 V motor.

ELECTRIC FURNACES

2—Bailey (Electric Furnace Co.) 75 KW Electric Arcy type side electrode tilting furnaces and transformers.

FIRE EXTINGUISHERS

St. Regis Model 181 Dry Powder for magnesium fires.

Buffalo 50 gal. soda-acid cart type.

FORK LIFTS

Baker 6000# Gasoline Fork Lift Trucks, KMH60, 120" lift, 88" collapsed height, 42" forks, solid tires. Rebuilt-Guaranteed.

Ross Fork Lift Truck, 19 HT, high lift, 6000# capacity, 14' lift, 48" forks. Pneumatic tires. Rebuilt-Guaranteed.

GRINDERS, DISC

Besley 208 Double End 26" x 2¾" wheel with 2 compound tables, V belt drive, 15 HP, 220-440 totally enclosed motor, magnetic starter controls.

2—U. S. Model 80 Double End 2-18" dia. wheels, 7½ HP motor, 2 swinging tables 8" x 14"—1 with hand lever feed.

GRINDERS, SNAGGING

McCabe 2" x 24" wheels, 48" between wheels, 3/60/440 V.

Ransom 8B Double End 2" x 20" wheels, 220 V motor, p/b control.

1—Hammond type 20 WR2—3" x 24" wheel, double end grinder, single speed, 20 HP Louis Allis Squirrel Cage, 220-440 V—1760 rpm motor.

2—Norton Type D, 3" x 24" wheel, 66" between centers, flat belt drive.

GRINDERS, SWING

Fox 10 HP 3/60/220 V Swing Frame, 2 speed.

U. S. 15 HP, 3/60/440 V Swing Frame, 2 speed.

Fox 15 HP Swing Frame, 2 speed.

Marschke 20 HP, 2 speed.

HOISTS

500# American LoHed.

1000# Cleveland 220/440 V.

1000# Detroit 220/440 V.

5—1000# P & H Hevi Duty with trolley.

2—2000# P & H Hevi Duty with trolley.

2000# Detroit Electric.

2000# American LoHed.

11—4000# P & H Hevi Duty with trolley.

2—4000# P & H Hevi Duty with trolley and powered drive unit for moving hot metal.

2—5 Ton Air Hoists with motor driven trolleys.

LADLES

3 Ton Whiting Mixing Ladle on wheels.

1 Ton Enclosed Gear Crane Ladle truck type, 4 wheel car for 18" gage track, Whiting Junior.

1 Ton Whiting Standard enclosed gear crane ladle, truck type, 4 wheel car for 18" gage track.

1—20½" Top Whiting Enclosed Gear Ladle.

MOLDING MACHINES

2—Champion Pin Lift Pushoffs, 44" x 44" x 12" draw.

2—Champion Pin Lift Pushoffs, 46" x 46" x 12" draw.

1—Champion Jolt Squeeze Strip Molding Machine, column type, 12" jolt cylinder, 8" lift, 18" x 21" table.

1—Champion Hand ram, hand clamp, hand rollovers 26" x 14" table.

2—Champion Hand Ram, Hand rollover, Hand draw core machines, 15 x 15 bed.

3—Davenport Portable Jolt Rollover Pattern Draw 20" x 24" tables, open end, 8" draw.

1—International Type G 24 x 10 Jolt Rollover, foot draw, 22 x 30 table, 10" draw.

1—International Type G 30 x 12 Jolt Rollover Foot Draw, 28" x 36" table, 12" draw.

1—International Type G 30" x 30" table, 9" draw, Portable.

2—International Type G 18" x 56" table, 8" draw. Portable.

1—International Type F Jolt Rollover 27 x 12, 12" draw, 35" x 26" table.

1—International Jolt Rollover Pattern 10" Draw, 22" x 30" plate, 6" jolt cylinder.

1—International Plain Jolt Molding Machine 48" x 60" table, no pit required.

1—Herman Jolt Rollover Pattern draw, 40" x 84" table, slotted nickel alloy table over regular table to accommodate various sized flasks, air clamp, new 1946. Used very little.

1—Herman 20" x 30" rollover pattern draw, 750# series. Air clamp.

2—Herman 20" x 24" Jolt Rollover Pattern Draw, 750# series. Air clamp.

1—Herman 4000# Series High Speed Rollover 30" x 60" with 32" x 48" bumper, 13" cylinder pattern device.

2—Milwaukee Arm Type Jolt Squeeze Strippers, 1500# capacity, Model 163-50 Serial 13104-5, 15" x 24" table, 16" x open end, pattern size. Late type.

1—Osborn 76J Portable Jolt Squeeze Molding Machine 12" cylinder.

3—Osborn Jolt Squeeze Molding Machines, 275J, 16 x 20 table, tilt back head.

2—Osborn 405 Jolt Rollover 40" x 70", 2000# capacity, 20" x 60" jolt table and 4 wheel receiving car.

1—Osborn Portable Jolt Rollover Pattern draw, 900# capacity. Model 601-13. 30" x 24" flask size, 10" draw.

1—Tabor 1000# Rollover, 30" x 60" table.

MULLERS AND MIXERS

Simpson #2 Motor on base, bucket loader.
Simpson #3 Motor on base, bucket loader.
Simpson #3 Type H open gear type.
Simpson #3 Open Gear Type.
American Model M Sand Cutter, 70" blades.
Clearfield 404—5 HP motor.
Kwick Mix Paddle Type.
Royer NDP 47 14" Belt, 4 rubber tires.

ROTOBLAST

Pangborn, table with 3-8" rotating work tables, 3 position loading, cleaning and touch-up designed for work similar in size to aircraft cylinders. Like New condition.

SHAKEOUTS

1—3' x 5' Link Belt.
2—4' x 6' Simplicity.

SPEED REDUCERS

Cleveland 408-R1, 36 to 1, 20.5 HP.
Falk Motoreducers 7½ HP.
U. S. Syncrogear Motors 7½ HP.
U. S. Syncrogear Motors 5 HP.

TUMBLING BARRELS

Whiting 30" x 48"
Whiting 48" x 60"

WIRE STRAIGHTENERS

2—Climax 1 HP motor.
1—Kane & Roach 3 HP motor.

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FOR SALE

Molding Machines

1—Link-Belt "Merry-Go-Round" Roller type mold conveyor complete with 35 cars 38″ x 72″
2—6000# Herman Jolt Rollover & Pattern Draw
2—#405-95 Osborn Jolt Rollover & Pattern Draw, 26″ draw
2—SA34 Davenport Jolt Rollover & Pattern Draw
1—SA28 Davenport Jolt Rollover & Pattern Draw
1—SA24 Davenport Jolt Rollover & Pattern Draw
2—30″ x 40″ Tabor Jolt Rollover & Pattern Draw
2—22″ x 32″ Tabor Jolt Rollover & Pattern Draw
4—814-P Osborn Jolt Squeeze Pin Lift
2—2114 Portable Jolt Squeeze Pin Lift SPO
2—#815 J & J Jolt Rollover & Pattern Draw
2—Herman Jolt Strippers 40″ x 60″ table
1—Osborn Jolt Stripper 3′ x 16′ table
2—International Type JFL Jolt Ram, foot-lever, pin-lift
3—International Type R Hand Rollover
Jolt Squeeze Molding Machines—SPO—Osborn, Tabor, Modern

Furnaces & Blowers

7—1000# Fisher Type "MNP" electric tilting, crucible type, Nose pouring, gas fired, 4 burners
1—500# Hausfeld Hand tilting
1—Stroman #14 non-tilt
1—Cupola blower—Spencer Turbine 50 HP 220/440/3/60 16 oz.
1—Cupola blower—North American 20 HP 220/440/3/60 24 oz.
1—Cupola blower—5½ Piqua 220/3/60, 30 H.P.
2—Furnace Blowers—3 H.P. 220/440/3/60 16 oz.

Core Blowers

1—#3E Demmler—weight of core up to 35 lbs.
1—#2K Demmler—weight of core up to 20 lbs.
1—#1 Demmler—weight of core up to 10 lbs.
6—#92 Osborn—weight of core up to 35 lbs.
3—Redford Bench type cartridge up to 2 lbs.

Sand Mullers

1—#3 Simpson 30 cu ft capacity. Model H Style E
1—#610 Clearfield 14 cu ft capacity under drive, with motor
2—#70 Beardsley-Piper 18 cu ft per batch
1—22″ x 78″ Link-Belt Paddle type
1—Link-Belt Pugmill 42″ x 96″

Shake-outs

1—4′ x 6′ Simplicity Model D 16000# cap., 10 H.P. 220/440/3/60
1—4′ x 6′ Robbins 8000# cap.
1—4′ x 10′ Robbins, 12000# cap., 7½ H.P. 220/440/3/60

Sand Slingers

2—16″ head Beardsley-Piper Stationary 10 H.P. 220/440/3/60

Grinding Equipment

2—Fin Cleaning Machines for cylinder heads—Ireland
1—#30 Gardner double end disc grinder, V-belt driven
1—#6 Cheesly disc grinder dir. conn. 18″ wheel
1—10 HP Black & Decker dble end 20″ x 3″ wheels 220/440/3/60
2—7½ HP Safety Emery Wheel dble end 18″ wheels 220/3/60
4—5 HP Safety Emery Wheel dble end 18″ wheels 220/3/60
1—3 HP double end grinder, flat belt driven 220/440/3/60
1—7½ HP Universal Swing Grinder 220/440/3/60

Cranes & Hoists

1—40′ overhead bridge crane, 3 ton capacity, cab operated 220/440/3/60
1—30′ span hand travelling bridge crane
1—20′ span hand travelling bridge crane
3—12′ span hand travelling bridge crane
6 Louden Monorail systems
Ingersoll-Rand airhoists 1000# to 6000#
Electric Hoists ½ ton to 1 ton

Air Compressors

1—40 HP Ingersoll-Rand single stage horiz. 220/440/3/60
1—150 HP Ingersoll-Rand two stage horiz. 220/3/60

Misc. Foundry Equipment

1—Atlas Car & Mfg. Co. Car scale
2—Charging cranes for cupolas, Shepard 3 ton cap. D.C.
1—Uni-Wash Newcomb-Detroit Wet dust collecting system
1—Pigmold conveyor 64′ centers, Link-Belt
1—6500# Toledo Floor scale
12—Whiting and Modern Pouring ladles, 350# to 1800#
100′—24″ Belt Conveyor, frame, troughing idlers, drives, etc.
2—#3 Jeffrey electric vibrators
4—#4 Jeffrey electric vibrators
1—2 compartment Coleman Core Oven, 6′ x 8′ doors
1—2 compartment Rybolt Core Oven, 4′ x 6′ sliding doors
8—Cleaning cabinets for magnesium with exhausters & motors
Roller conveyor above rail, 14″ to 36″ in width
1—Impregnating room fully equipped
1—Blaw-Knox Clamshell bucket size 308-F
1—Link-Belt aerator with drive complete
2—1000 Gals. p. Min. Centrifugal Pumps, I-R., 30 HP 220/440/3/60
1—Link-Belt Core Breaker Drum 6′ x 10′
1—Revolving Core conveyor table—Bush-Lawrence
1—#55 American Dust Collector 3300 CFM
2—Tumbling barrels, 18″ x 36″ and 48″ x 75″

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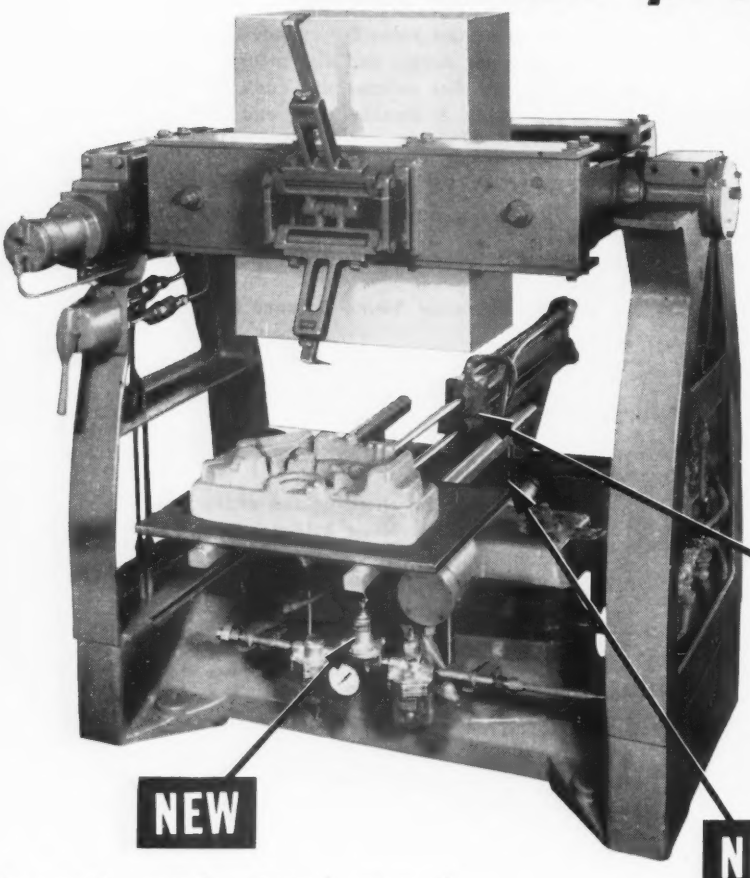

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In addition, because every core is drawn automatically and uniformly, even unskilled operators can maintain peak output of the most complicated cores.

Hundreds are in use. Now, with the above improved features, many more foundries will be modernizing and economizing by installing these SUTTER Core Draw Machines. Write for the free bulletin which contains complete information. Send for it today.

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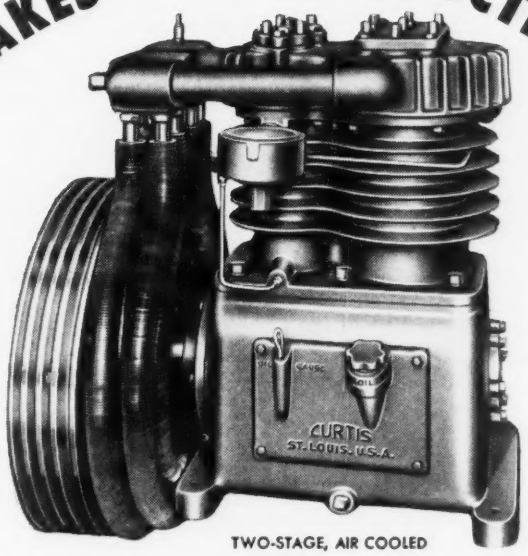
Curtis AIR COMPRESSORS AIR HOISTS AIR CYLINDERS

MAKES YOUR PRODUCTION MORE PROFITABLE

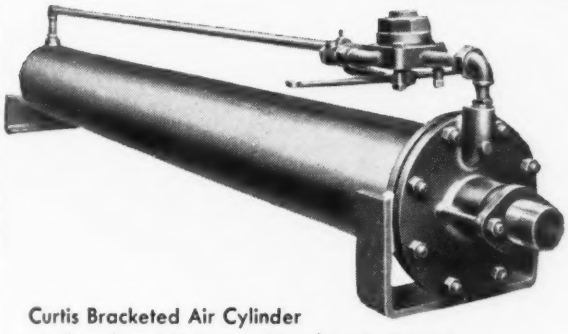


TWO-STAGE, AIR COOLED

PRECISION BUILT COMPRESSORS UP TO 50 H.P.

- Advanced two-stage design saves electric current.
- Delivers more air per horsepower.
- Timken tapered main bearings.
- Pressure lubricated rod and piston bearings.
- Assures long trouble-free performance.

TIME-SAVING Curtis Air Cylinders and Air Hoists



Curtis Bracketed Air Cylinder can be placed in any position from horizontal to vertical. Will lift, lower, push or pull.

- Low-Cost lifting, lowering, pushing, or pulling
- Accurately controlled operating speed
- Cylinders are ground and polished
- Valve is of disc type lapped to its seat.

Curtis Pendant Air Hoist for any lifting or lowering job where headroom is not limited.

In 1954,
Celebrating 100 years of successful manufacturing experience.

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1922 Kienlen Avenue St. Louis 20, Missouri

CURTIS PNEUMATIC MACHINERY DIVISION 772
of Curtis Manufacturing Co.
1922 Kienlen Avenue, St. Louis 20, Mo.

I am interested in items checked below:

☐ AIR COMPRESSORS ☐ AIR HOISTS ☐ AIR CYLINDERS

Capacity...Current... Load...Lift... Load.....Lift.....

Name.....

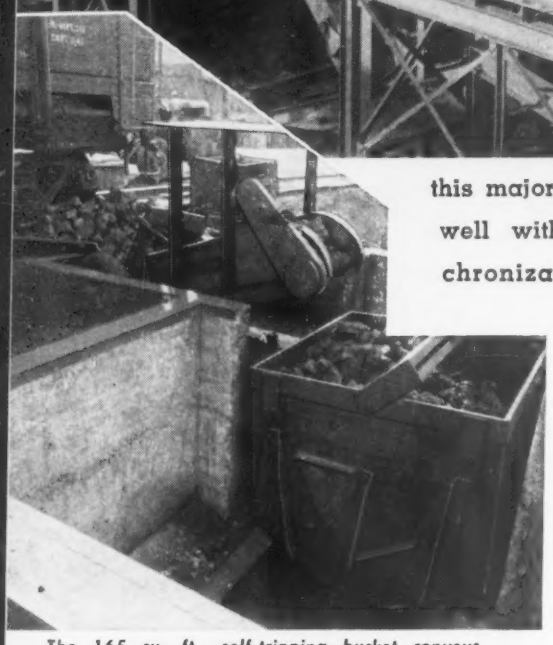
Firm.....

Street.....

City.....Zone....State.....

Costs on CHARGING and MELTING Are Down Because...

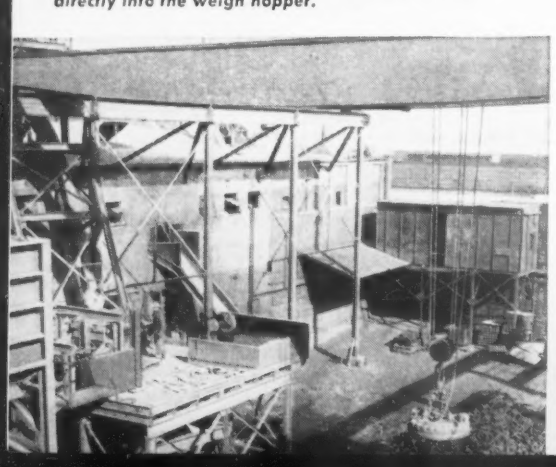
this major producer* of castings has planned well with MODERN engineers in the synchronization of every handling operation:



The 165 cu. ft., self-tripping bucket conveys coke and stone, by crane, from car unloader to bin and batch larry. Scrap and pig are charged directly into the weigh hopper.

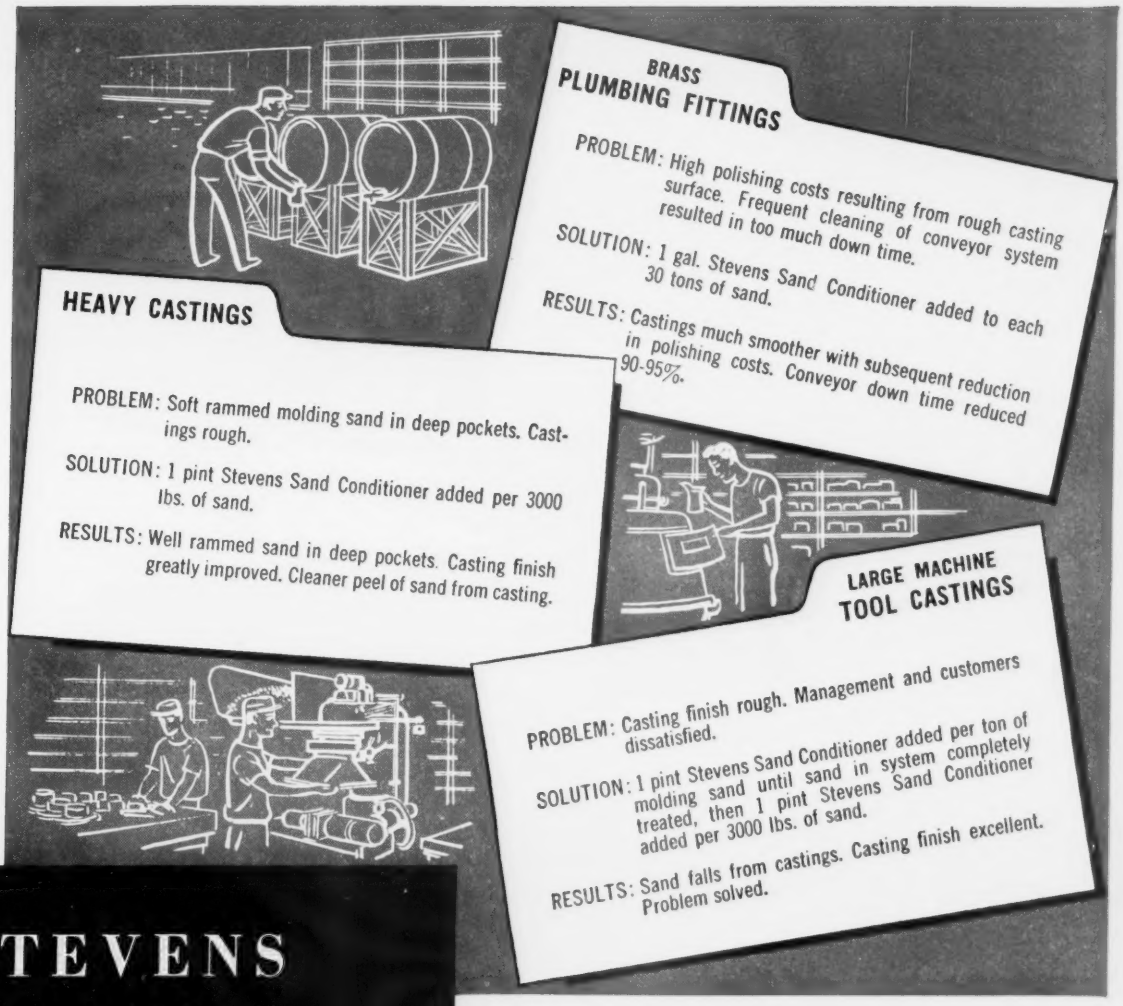
*Lakey Foundry Corporation, Muskegon, Michigan is a major producer of grey iron castings for the automotive, agricultural and household appliance industries.

All components flow mechanically from gondola cars, through MODERN 108" cupolas, to the molds on the pouring floor. Undercar unloaders . . . coke and stone buckets . . . bins . . . hoppers . . . scales . . . MODERN Small-Cone charging bucket . . . inclined-swivel charger and the melting equipment team together to pull down costs while boosting the over-all quality.



Much of this controlled, time-proved mechanization is described in bulletin S-147-B. A note on your letterhead will start our thinking about ways to cut your costs RIGHT NOW while we're planning together for tomorrow's expansion . . .

MODERN EQUIPMENT COMPANY
Port Washington, Wisconsin


BRASS
PLUMBING FITTINGS
PROBLEM: High polishing costs resulting from rough casting surface. Frequent cleaning of conveyor system resulted in too much down time.
SOLUTION: 1 gal. Stevens Sand Conditioner added to each 30 tons of sand.
RESULTS: Castings much smoother with subsequent reduction in polishing costs. Conveyor down time reduced 90-95%.
HEAVY CASTINGS
PROBLEM: Soft rammed molding sand in deep pockets. Castings rough.
SOLUTION: 1 pint Stevens Sand Conditioner added per 3000 lbs. of sand.
RESULTS: Well rammed sand in deep pockets. Casting finish greatly improved. Cleaner peel of sand from casting.
LARGE MACHINE
TOOL CASTINGS
PROBLEM: Casting finish rough. Management and customers dissatisfied.
SOLUTION: 1 pint Stevens Sand Conditioner added per ton of molding sand until sand in system completely treated, then 1 pint Stevens Sand Conditioner added per 3000 lbs. of sand.
RESULTS: Sand falls from castings. Casting finish excellent. Problem solved.

STEVENS SAND CONDITIONER

solves both mold and core production problems

These recent cases, taken from our files, show what Stevens Sand Conditioner has done to assure better castings for a few of the many satisfied Stevens customers. Here's how Stevens Sand Conditioner can help solve your core and mold production problems:

1. Increases flowability of core and molding sand to prevent soft rammed areas and pockets.
2. Cores draw easier from boxes, patterns draw easier from molding sand.
3. Improved casting finish on core and mold surfaces.
4. Sand peels better from castings.
5. Prevents sand from sticking in mullers, conveyors, hoppers and all sand handling equipment.

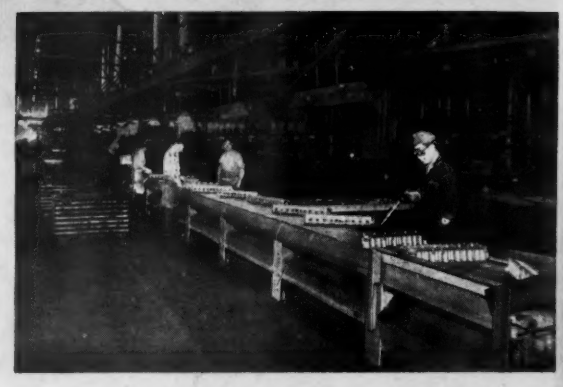
Get more facts about this non-toxic, low-cost Sand Conditioner today. Call your Stevens Sales Representative, or write direct for Stevens Technical Bulletin F 101. FREDERIC B. STEVENS, INC. Detroit 16, Mich.

FREDERIC B.
STEVENS
INCORPORATED
EVERYTHING FOR A FOUNDRY
DETROIT 16, MICHIGAN

BRANCHES: BUFFALO • CLEVELAND • INDIANAPOLIS • NEW HAVEN • DAYTON
IN CANADA: FREDERIC B. STEVENS OF CANADA, LTD., TORONTO • WINDSOR

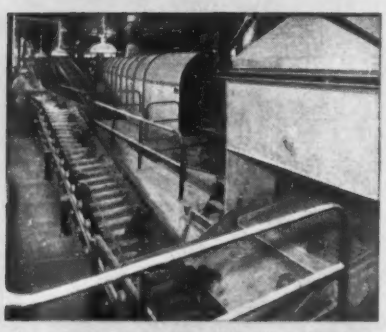
Above; Unloading Zone of 315′ Long Sorting Belt Handling Miscellaneous Castings After Grinding.

Above; 370′ Long—24″ Wide Flat Top Chipping Conveyor Handling Automotive Castings Through Various Cleaning Room Operations. *At the Right;* 130′ Long Chipping Conveyor for Finishing Head Castings.



Engineered Castings Handling Systems

. . . assure the continuous, uninterrupted flow of castings through chipping, grinding, sorting and inspection departments; — eliminate repeated handling and rehandling of work in process; — avoid stock piling between operations; — increase tons per hour production per man; — and reduce costs.



Apron Conveyor Handling Hot Castings from Vibrating Shakeout.

● Bartlett-Snow castings handling and cleaning room installations reduce the time and cost of handling castings from the shakeout to the shipping room. They synchronize and coordinate all cleaning room operations to the tonnage passing over the foundry shakeout. Belt, apron, oscillating, roller, car type and slat conveyors, engineered to meet your individual requirements!

Castings Cooling and Sorting Conveyor in Cleaning Room of High Production Gray Iron Foundry.

DESIGNERS

ENGINEERS

BARTLETT-SNOW
CLEVELAND 5, OHIO

FABRICATORS

ERECTORS

Foundrymen Who Know — Buy Bartlett-Snow